VOL. XXVII. No. 8 AUGUST 1942

MECCANO MAGAZINE

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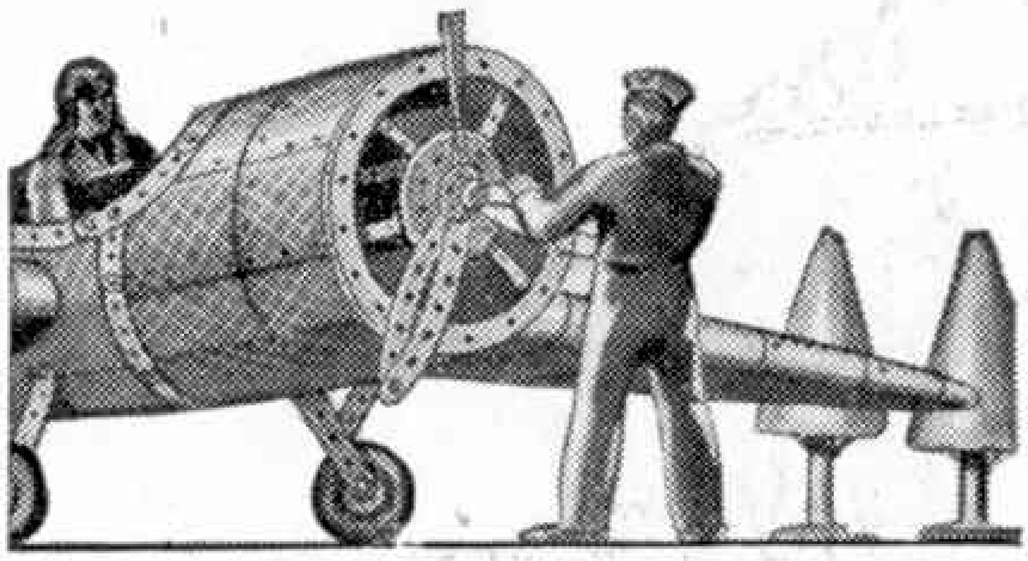

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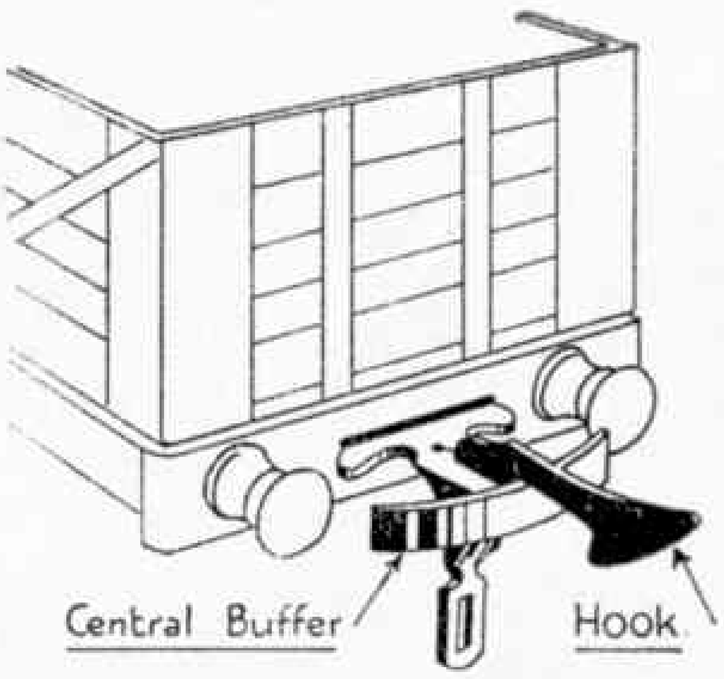

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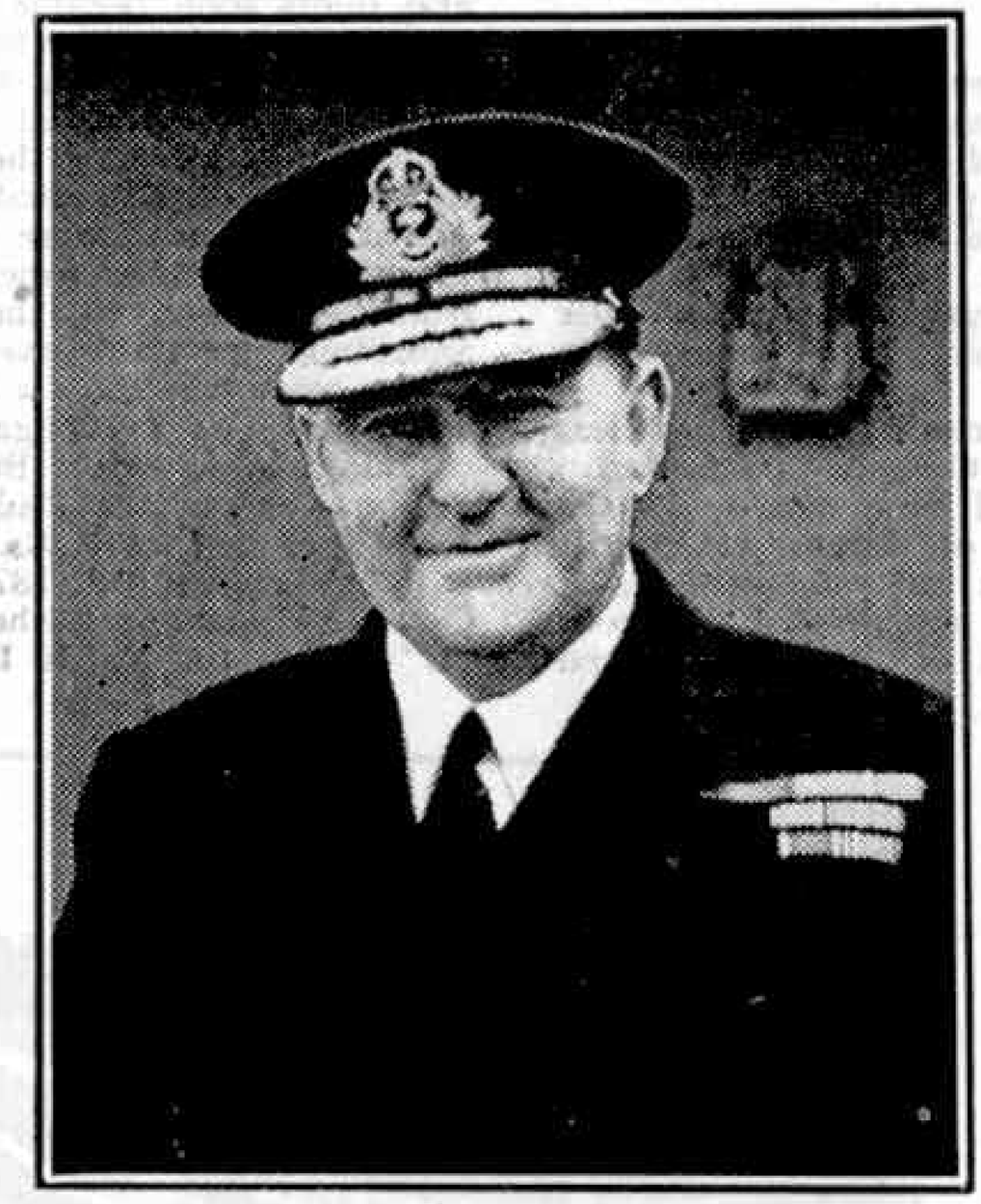
With the Editor

Famous Composer Who Took Engine Numbers

It is always good to hear of a great man having been devoted to a hobby in which *"M.M."* readers are interested. I was specially pleased to read in that always interesting paper *"Musical Opinion"* some notes by H. Hollander on Dvorak, the famous Czech composer.

Dvorak, we are told, "used to pay daily visits to the Francis-Joseph Station (now Wilson Station) in Prague, which was close to his flat, and watch the trains arriving and leaving. He remembered very accurately the numbers of the engines as well as the names of the engine drivers. When sometimes prevented from giving way to his hobby, he used to send one of his pupils to the station to find out which engine was going to be put on the express train. One of his messengers was once Josef Suk, already engaged to Dvorak's daughter at the time. Dvorak, the engine expert, recognised straightaway that the number Suk reported was wrong: it was the number of the tender and not that of the engine. Dvorak rebuked Suk for his inattention, and turning to his daughter said reproachfully: 'You want to get married to that sort of person!' "



Rear-Admiral Sir Henry Harwood, K.C.B., O.B.E., Commander-in-Chief, Mediterranean.

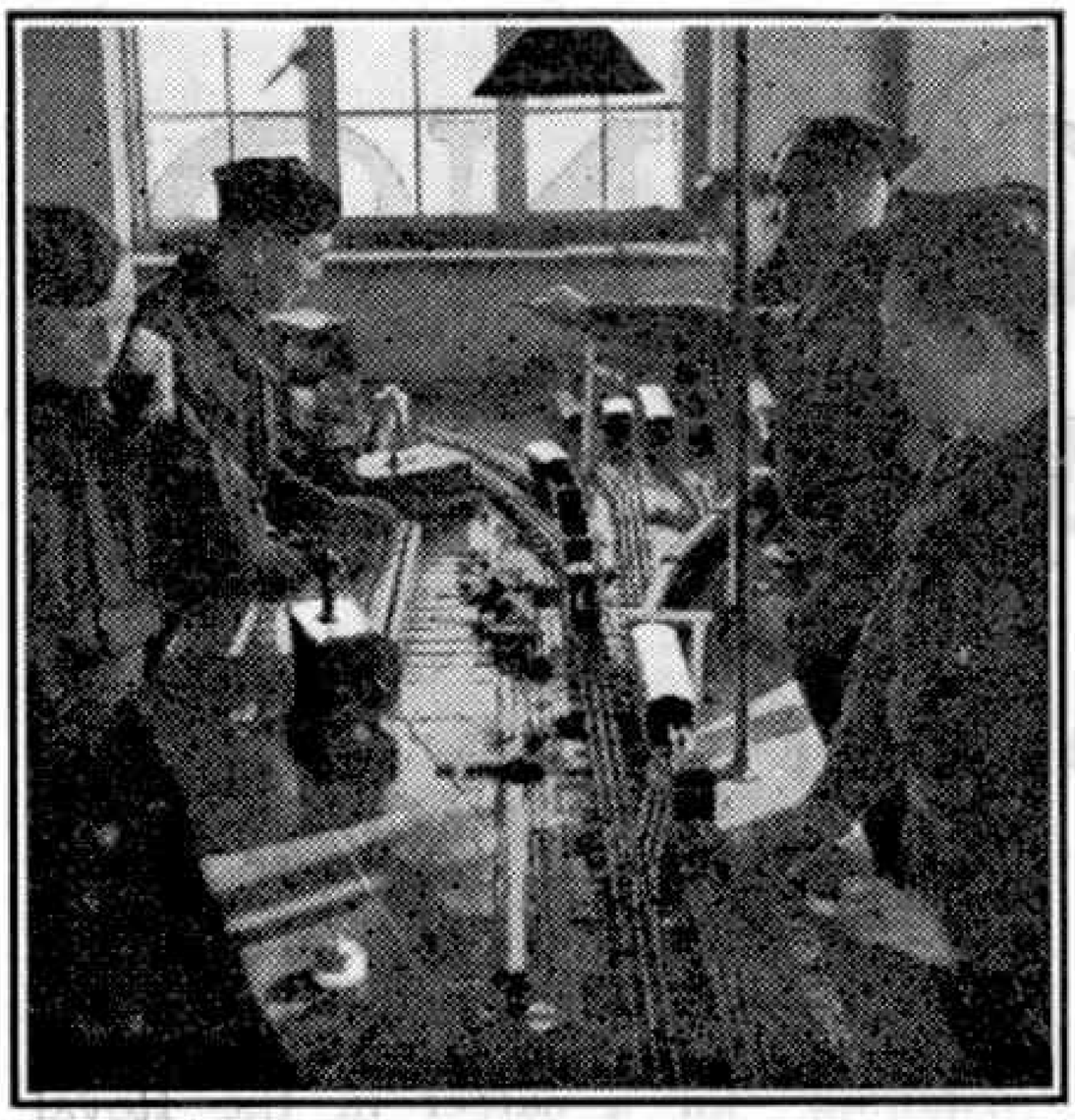
Leaders in the War

Rear-Admiral Sir H. Harwood

Rear-Admiral Sir Henry Harwood was born in 1888. He was trained on H.M.S. *"Britannia"* for a career in the Royal Navy and became a midshipman in 1904. He was a Lieutenant by 1908, and by 1921 had attained the rank of Commander.

Harwood was given command of the destroyer *"Warwick"* of the 9th Destroyer Division in 1929, and after a spell at the Imperial Defence College in 1931-2 he was appointed to H.M.S. *"London"* in 1932. He left the ship two years later to join the staff of the R.N. War College. In 1936 he was made Commodore and given Command of the South America Division and of the cruiser *"Exeter."* In this capacity he commanded the British Forces in the thrilling action by the *"Exeter"* and the cruisers *"Ajax"* and *"Achilles"* against the German pocket battleship *"Graf Spee"* in the South Atlantic on 13th December 1939. Later he was promoted to Rear-Admiral.

In 1940 Sir Henry became a Lord Commissioner of the Admiralty and an Assistant Chief of Naval Staff, and in May of this year he succeeded Vice-Admiral Sir A. B. Cunningham as Commander-in-Chief, Mediterranean.



Royal Engineers learning rail-work on a miniature railway.

The Story of the Royal Engineers

By Captain J. E. A. Whitman

FROM the earliest times the engineer has played an important part in the conduct of war. The arbalistes, or great slings, of classical wars, the besieging towers and the many other appliances of mediæval days, and of course the city walls and fortresses themselves, all bear witness to his skill; and so too does the wonderful system of roads all over Europe and parts of Asia which have come down from the Romans.

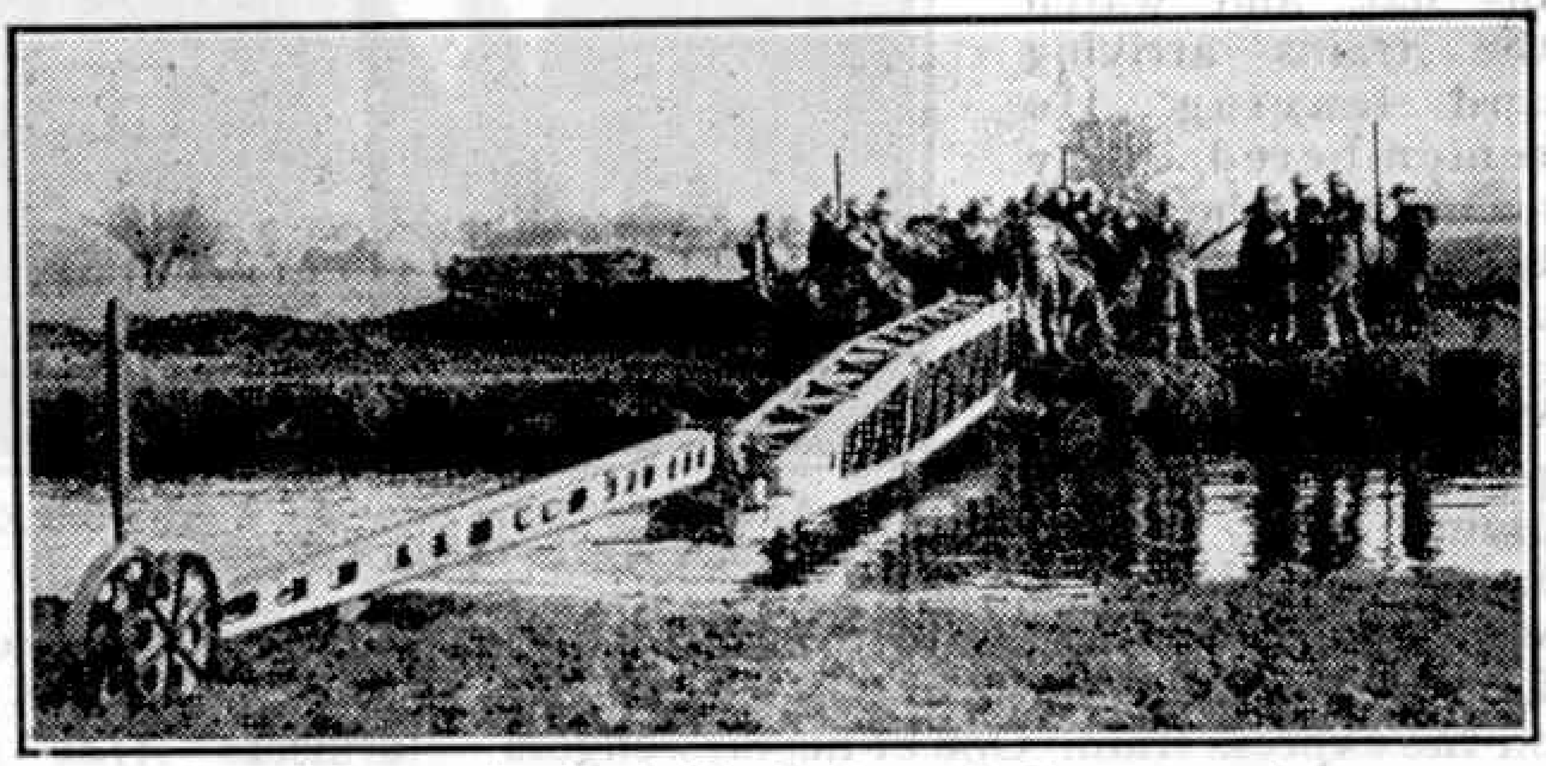
Military Engineers have included many soldiers known to fame. For instance, Coehorn, a Dutchman who served with William III and conducted the engineering works of the siege of Namur, afterwards serving with Marlborough in all his campaigns; Vauban, who designed and supervised the construction of the fortifications of over a hundred French towns, and inaugurated an entirely new system of fortress planning. He is said to have personally conducted 40 sieges, and left behind numerous treatises on the art of fortification. Carnot, the great French Minister of War in the days of Buonaparte, known as the "Organiser of Victory," was an Engineer; and in more modern times General Gordon and Lord Kitchener both belonged to this famous corps.

For many years after the introduction of gunpowder, the men, stores and weapons required for waging siege warfare were collected as occasion arose into an Ordnance Train and sent to the theatre of war, the work of these troops covering both artillery and engineering branches. But in 1683 the Ordnance Train was split into two parts; the officers remained as Engineers and the rank and file became gunners. It was not, however, until 1717 that the engineers' activities were fully appreciated, and they were organised as a properly constituted military force. In 1757 further recognition was given, and the officers received their commissions direct from the King. The rank and file were still raised as required and known simply as Military Artificers; but in 1772 the Commandant of Gibraltar raised a company of these, officered from the Royal Engineers, to hasten the work of fortifying the Rock. The value of their work was proved in the great siege of 1778-1781, and for their gallantry and good work there the title of "Royal" was granted; at the same time the soldiers became the "Royal Military Artificers." In 1812 the name was changed to "Royal Sappers and Miners," and in 1856 the two branches were amalgamated under their present title. In the Service, however, they are still affectionately referred to as "The Sappers."

The work of the corps was originally that of fortifying places and positions and making trenches and field works for the forces attacking those places, as well as the construction of roads and bridges. It was therefore the engineer branch that enabled the rest of the army to move and to fight. The organisation of water supplies and construction of storage and ducts soon became added to these duties. The preparation of mines had early been a matter for the Engineer; and in their infancy the submarine mines defending naval bases and ports were also another little job for the Sappers.

The progress of invention during the 19th century added more and more to the work of the Royal Engineers. In the Crimea, a railway was constructed from Balaclava to the entrenched camp before Sebastopol for the conveyance of stores and removal of the wounded; while a telegraph line was laid under the Black Sea to Bulgarian territory so that swift communication with Britain became possible. In this way began the Railway Operating Division and the Signal Service R.Es.

It was not until 1870 that the first Telegraph Company was established, when it was known as "C" Troop (in which Lord Kitchener served as a subaltern). It performed great service in the Zulu and other campaigns; and in Ashanti in 1895-6 a signal detachment actually arrived at Kumasi ahead of the fighting troops, and its blue and white flag was hoisted before King Prempeh. In South Africa the unit expanded from 12 officers and 321 other ranks to 24 officers and 2,424 men; and it laid over 18,000 miles of line. The figures for the Great War reached astronomical proportions, and in 1920 The Royal Corps of Signals was formed to take over



The girder work of a bridge being pushed across a river.

The test: A Bren gun carrier crosses a newly-constructed bridge.

this side of the work of the Royal Engineers.

Bridging work of course springs to the popular mind whenever the Sappers are mentioned, and very remarkable have been their feats in this direction, from the pontoon bridges almost literally "thrown across" streams—in, as it seems, almost a matter of minutes—to structures having a considerable degree of permanence, carrying roads and railways through devastated, and sometimes virgin, country. Road making and maintenance form another great branch of the Sappers' work, and any who remember the appalling tracks that did duty for roads in Flanders during the last war will accord the highest praise to the Engineers for the ceaseless and skilful effort that made them usable at all.

Most boys have wanted at some time or another to drive a railway engine. One way to do it is to join the Royal Engineers. At Longmoor in Hampshire is the depot of the Railway Section where every branch of railway engineering is studied and practised, from surveying and laying the track to operating the signal system that controls its working. The art of driving every kind of engine is taught; you can play with a fussy little narrow gauge locomotive, almost a toy, up to the ponderous eight coupled giant of the standard gauge. It's a great place to play at trains!

In the early days of steam road engines—traction engines, etc.—these too were managed by the Sappers. The first used in war went to Ashanti in 1873 where the shrill noise of its whistle much impressed the natives. But in later years road transport of this nature passed to the R.A.S.C., although of course a certain number of such engines are still used by the R.E. for their own purposes.

The construction, repair and general maintenance of field fortifications is still a matter for the Sappers; and so is the provision of accurate maps of sections of the front, artillery positions, etc. And in peacetime a good deal of the work of the Ordnance Survey and the preparation of maps for civil use is done by the Topographical section of the Engineers.

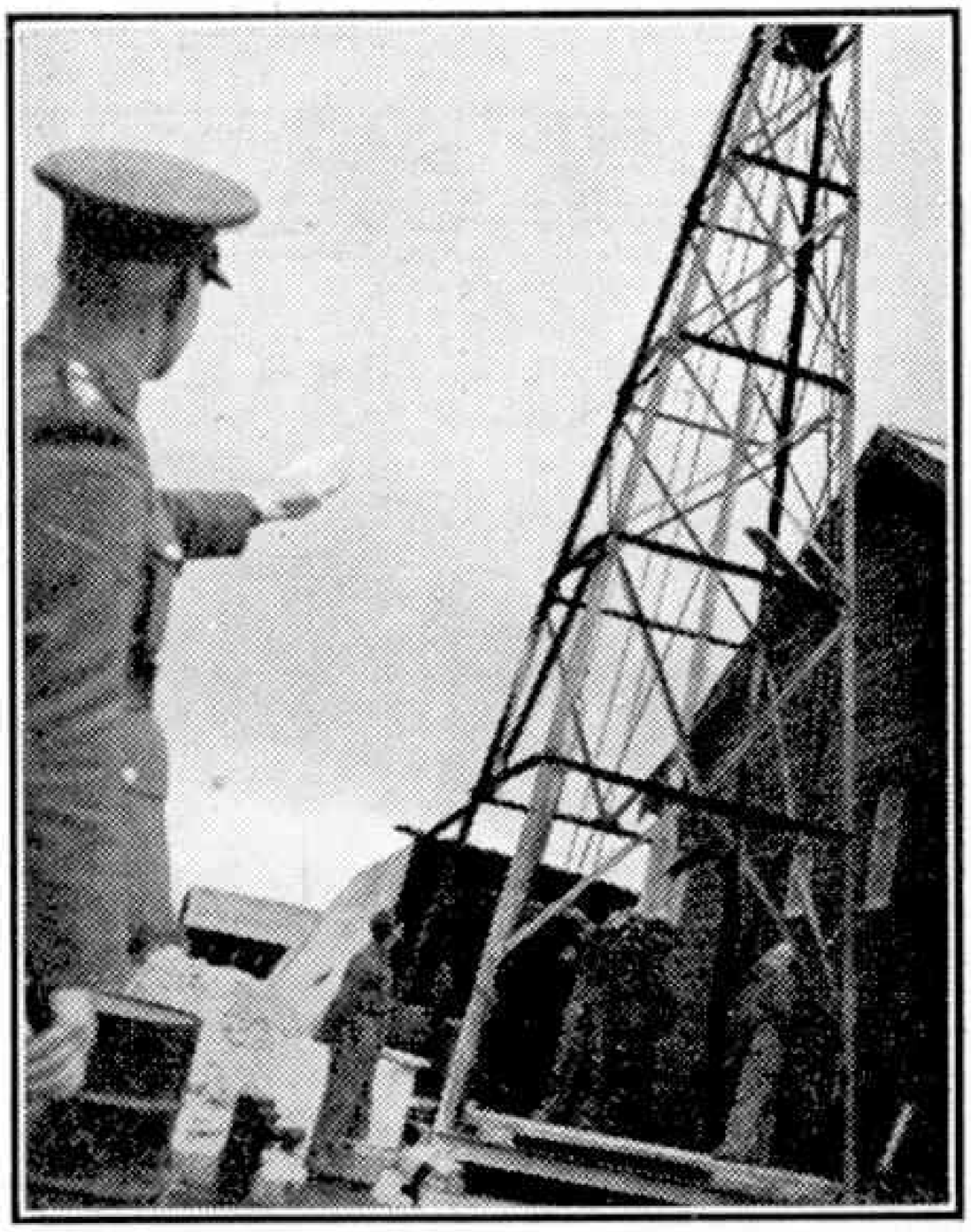
In the present conflict the work of the Sappers has, in the nature of things, become more diverse than ever before. Not only have pipe lines for water to be laid, but in many cases, in the Desert Campaigns, wells have had to be sunk and special equipment sent out for coping with the task. In the Far East, bridges have been made of rope and bamboo over crevices and ravines; and the making of roads and tracks has had to begin with the cutting away of thick woods and dense jungle undergrowth.

Owing to the fortunes of war and the extreme mobility of the opposing forces, the demolition squads of the Royal Engineers have found their hands very full. From the blowing up of bridges and quays, and the mining of roads in Flanders and Northern France, to co-operating in various destructive works as part of the "Scorched Earth" policy in Malaya and Burma, the pupils of the explosives and demolitions school have found ample opportunity to put their training into practice.

In addition to the various field works and fortifications already known and used, this war has called for the construction of tank traps and various anti-tank obstacles. In some cases the traps have resembled the hunter's "elephant pits"; a huge hole in the ground dug with perpendicular sides, and, on a framework of branches or light timber, a covering of turf or other topgrowth similar to that of the surrounding ground. Very effective they have proved. Road obstacles often take the form of concrete cylinders which can be rapidly placed in suitable positions; many of these can be seen in the English countryside at the present time. Another form of obstacle is made by erecting lines of concrete projections, for all the world like the teeth of a tractor band, stretching for miles across open country. The positions are staggered, so that those in the second and third lines are opposite an opening in front, and they constitute a formidable barrier to surmount. Even when tanks can eventually overcome them, the delay caused is sufficient to enable the defenders' artillery to concentrate a heavy fire on the attackers.

As already mentioned, much of the repair and maintenance work formerly done by the Royal Engineers has passed to the Royal Army Ordnance Corps, or to the younger Royal Corps of Signals. But much remains, and there are still many workshops in the field, mobile and otherwise, serviced by them.

In fact we might conclude by saying that a Sapper's work is never done, but it is always done well!



At the School of Military Engineering. Royal Engineers erecting a well-boring rig.

How Windmills Work

A Vanishing Industry

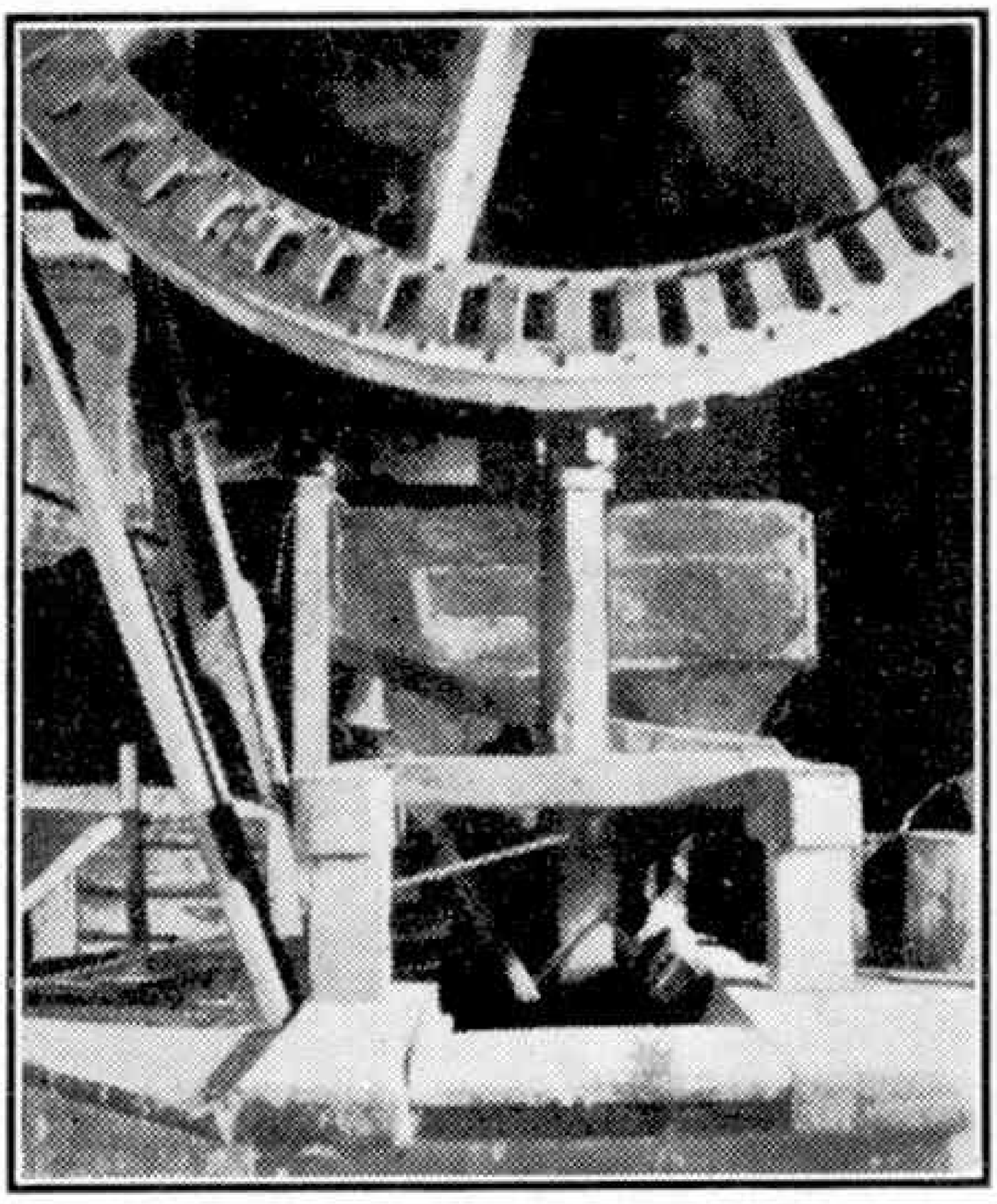
THE art of grinding corn between the faces of revolving stones is one which can be traced back through many centuries, starting from primitive hand querns and progressing to watermills and then windmills, until with the coming of steam and electric power the grain is now milled between revolving iron rolls.

In contrast to the general wealth of archæological discovery in this country, we have no remains of windmills earlier than the 17th century, although a few early millstones have been found, such as that at Richborough Castle in Kent. Furthermore, few drawings or descriptions of early mills have been handed down.

The first mills were built almost entirely of wood; even the gear wheels, some of them up to 10 ft. in diameter, were made of wood, with inserted wooden teeth. This no doubt accounts for the complete disappearance of the older mills. John Smeaton the lighthouse builder, is said to have introduced the use of cast iron gearing in the 18th century.

The windmills we have remaining are of very sturdy construction, and the old millwrights did wonderful work in harnessing the wind, one of Nature's most uncontrollable forces. Combined with this strength great ingenuity is evident, and is well illustrated in the accessories which abound in windmills and watermills—the governors, alarm bells and hoists for the sacks of grain, and the countless different types of gearing. The centrifugal governor, afterwards used for the steam engine, may well have been invented by a millwright.

A beautiful mill at Polegate, near Eastbourne. The illustrations are from photographs by Mr. H. M. Hoather.



The wheel and pinion mechanism driving the stones.

The first type of mill built in this country was the post mill, in which the whole of the body of the mill could be turned around a vertical post in order to make the sails face the wind. The mill shown on this month's cover picture, which is based on a photograph by Mr. H. M. Hoather, is of this type, although it is not a very early example as it has a "fan tail" to turn the mill and bring the sails into the wind. Also the lower part is built up to form a round house used for storage.

During the 16th century the tower mill was invented. Here only the extreme top or "cap" is turned to bring the sails into the wind; and with this arrangement all the machinery is housed in a fixed and comparatively roomy building. The cap may be turned by hand or by means of a fan tail as shown in the accompanying picture of a mill at Polegate, Sussex.

Both types of mill have a similar interior layout; the sails are mounted on a large wooden or iron "windshaft," which carries the "brake wheel," so called because it is

A typical mill stone.

fitted with a band brake to hold the sails at rest when the mill is not working. The brake wheel also has teeth which gear with a wheel on a vertical shaft from which the drive to the stones is taken. The lower illustration on page 272 shows the drive, from a second wheel mounted on the windshaft, to one pair of stones in the post mill at Ash in Kent. The short vertical driving shaft can be seen, and the stones are covered with a wooden casing on top of which is mounted the grain hopper.

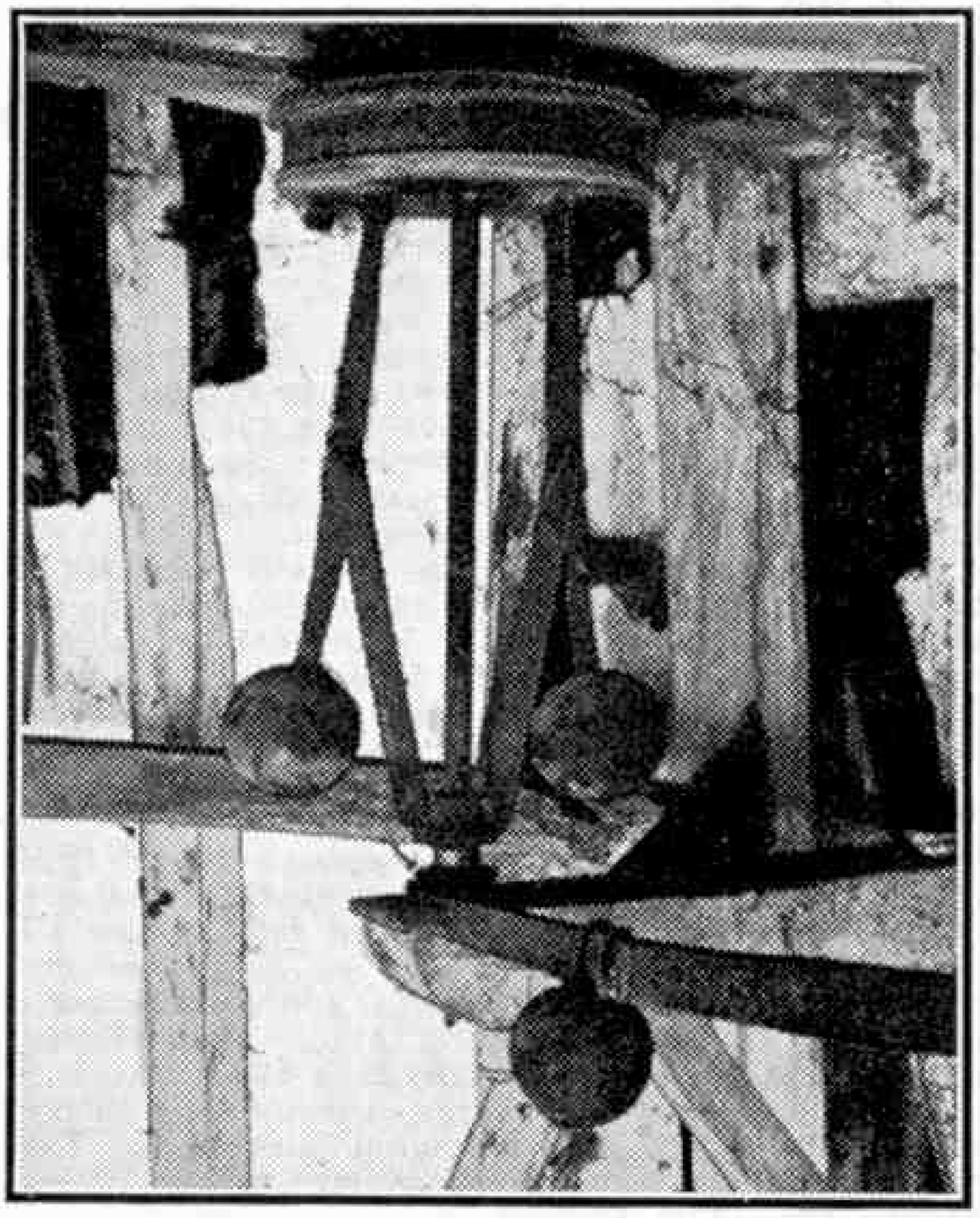
In the case of a tower mill there was an intermediate vertical shaft and gearing between the brake wheel and the drive to the stones, the drive being divided to several pairs of stones.

The stones are generally located on a middle floor of the mill so that the grain can be fed to them from an upper floor by means of shoots and hoppers, while the flour is led away by shoots to a lower floor.

A typical millstone, one of a pair used in a windmill at Margate, is shown in the upper illustration on this page. The lower or "bed stone" was fixed to the floor of the mill, with the flat working surface shown in the photograph placed uppermost and level. The "runner" stone revolved on top of the bed stone and was driven by the vertical shaft, previously mentioned, which passed through the central holes in the two stones, the speed being in the neighbourhood of 120 revolutions per minute. The grain from the hopper was fed into the hole at the centre of the upper stone and was ground between the stones as it passed outward to the edges.

The speed of the stones, which naturally depended upon the strength of the wind and the setting of the sails, was used to control the distance between the upper and the lower stones by means of a governor such as that shown in our fourth picture. This was found in a mill at Great Hormead, Herts. As the speed increased the governor lifted the upper stone by a minute amount, through a system of levers, so allowing more grain to enter between the stones.

The number of windmills now in use for grinding is unfortunately diminishing; it is probably less than 100, a mere fraction of the number working in the Middle Ages. Although the loss of these mills is very regrettable, it may be of interest to note that a large experimental wind-driven generator designed to develop over 1,000 h.p. is being completed in Vermont, U.S.A. But this piece of modern engineering is a far cry from the work of the millwrights which is such a picturesque addition to our countryside.



Governor for regulating the amount of corn admitted for grinding.

Railway Working in India—I

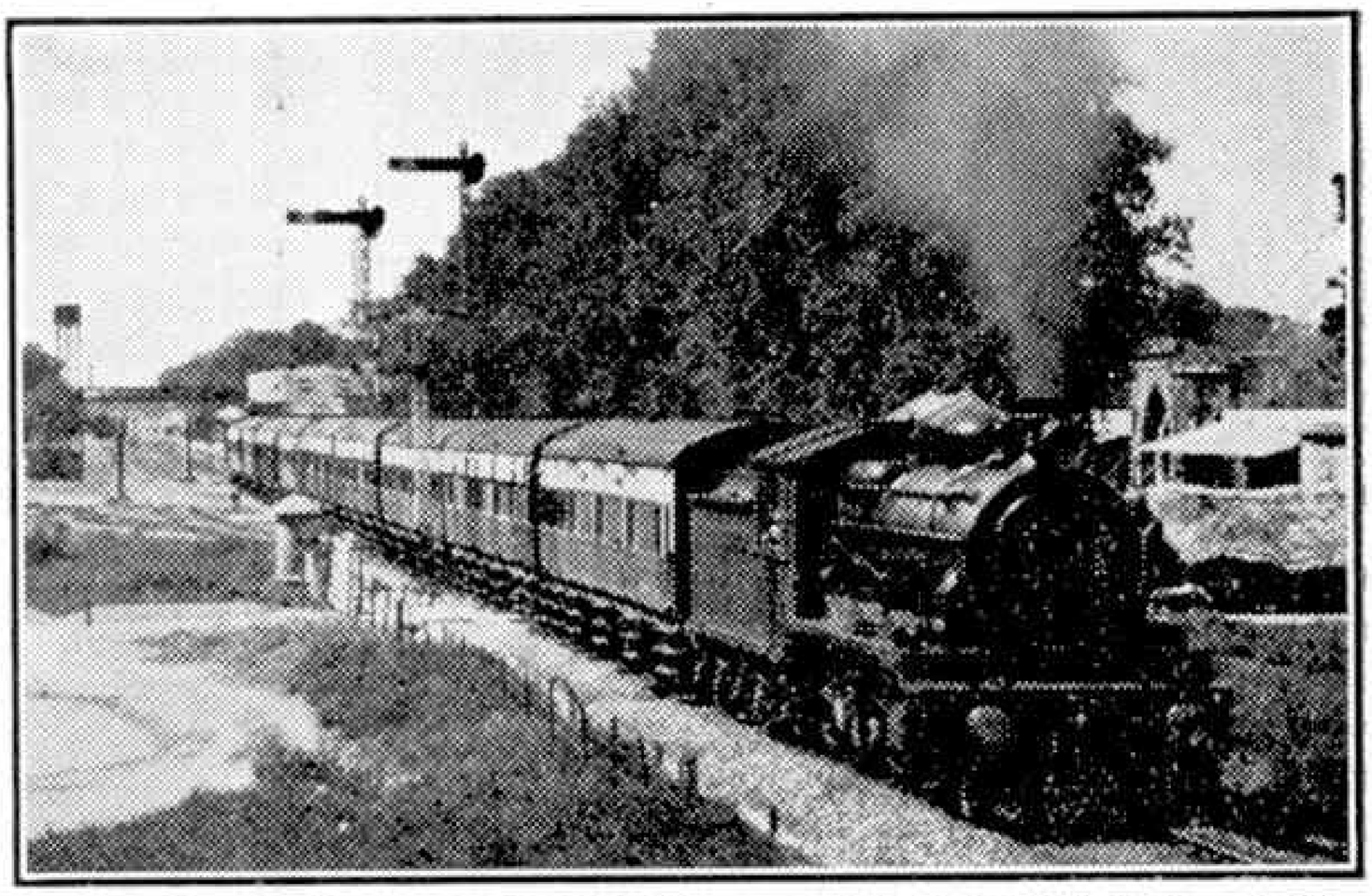
By O. S. Nock, B.Sc., A.M.I. Mech. E.

JUST over 70 years ago one of the earliest Fairlie type articulated locomotives created a profound sensation by some remarkable feats of haulage on the Festiniog Railway in North Wales. This success, however, was a mere nothing to the astonishing predictions made as to the future applications of the articulated principle. Among these ultra-optimistic statements was one by Mr. Fairlie himself, in which he pronounced that a 3 ft. gauge was ample for all railway requirements in India! Fortunately there were others whose conception of the Indian railway system was on an altogether grander scale, and the 5 ft. 6 in. gauge already adopted for the North Western Railway, and others wholly or partly constructed, was retained as standard for all the principal main lines. In India most of the leading systems have a number of branches laid with sub-standard gauge track, and these act as feeders to the main arteries of traffic. Some of these lines are laid on the metre gauge, others are 2 ft. 6 in. or 2 ft.

But although the main lines possess the initial advantage of spaciousness, as compared with the cramped layouts to which we are more or less accustomed in this country, the Indian railways are operated under climatic conditions that can often be very troublesome. The behaviour of rivers during the rainy season remains incalculable, despite all that modern engineering science can provide. Not long ago, for example, a serious accident occurred on the East Indian Railway through an express plunging into a breach in an embankment; the collapse had been caused by flood water permeating through the bank—how, it was never ascertained. An even more vivid example was provided during the construction of the Indus bridge at Kalabagh, on the North Western Railway. This was not a case of pioneer work in early railway days but an event in the year 1929, when a new bridge was being built to connect the broad gauge system of the railway, south-east in the Indus, with the 2 ft. 6 in. branches radiating from Kalabagh, on the west bank of the river. Before the construction of the new bridge a ferry service was in operation.

At the site of the bridge the river is over half a mile wide, at a point about 1¼ miles below the mouth of the gorge from which the Indus debouches into the plains. The flow of water here had already been carefully investigated by the Punjab Irrigation Department, and after much observation and checking by the engineers of the North Western Railway the maximum probable discharge estimated by the Irrigation Department was accepted. Since 1878 no flood had been experienced so great as the one in that year, and it was considered safe to base all calculations for the new bridge on conditions experienced then. Work duly began, and good progress was made till the summer of 1929. Then, during the monsoon, three exceptionally high floods occurred, the third producing a discharge of water fully 50 per cent. higher than the estimated maximum. The result was some very serious damage to the bridge works. Protection embankments were swept away; the railway terminus on the west bank was completely submerged; and a wagon ferry broke from its moorings, swept downstream and crashed on to one of the unfinished piers of the new bridge. Needless to say the calculations had to be entirely revised, and considerable amendment made to the design of the bridge.

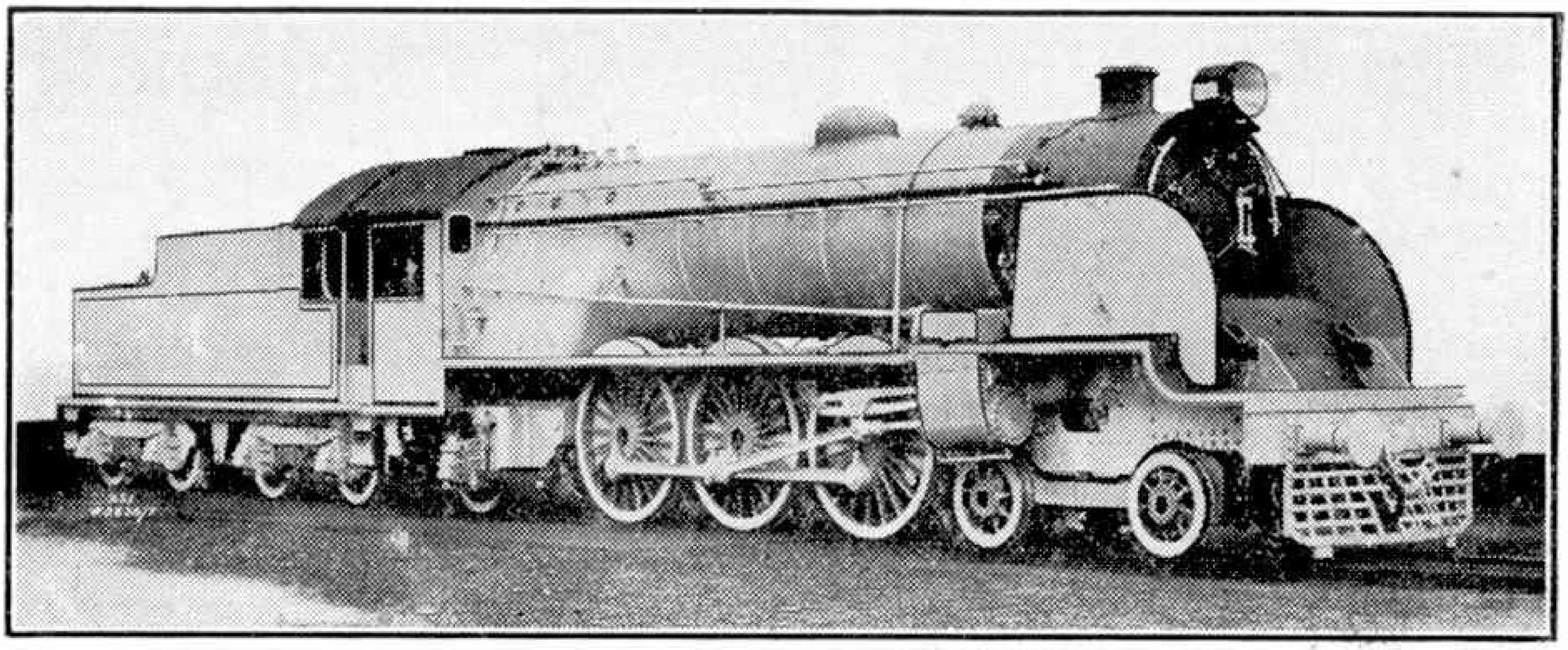
Apart from the ever-present likelihood of flood damage there are severe natural obstacles to railway operation in India. The narrow gauge lines leading to the Himalayan hill stations such as Simla and Darjeeling are of course exceptional; so is that amazing extension of the North Western Railway leading through the Khyber Pass. But there are other difficulties, leagues away from the great mountain ranges of the north. The hinterland of Bombay is not, in its broadest physical sense, unlike that of Sydney, in New South Wales; in both cases a range of mountains runs 20 to 30 miles inland and parallel with the coast, and through these mountains the railways find a way by zig-zags. It is the Great Indian Peninsula Railway that thus ascends the Western Ghats, as this range is known, where conditions are as severe as in the Blue Mountains of New South Wales.



East Indian Railway. Delhi-Calcutta express leaving Fatephur. Photograph by W. Stokes.

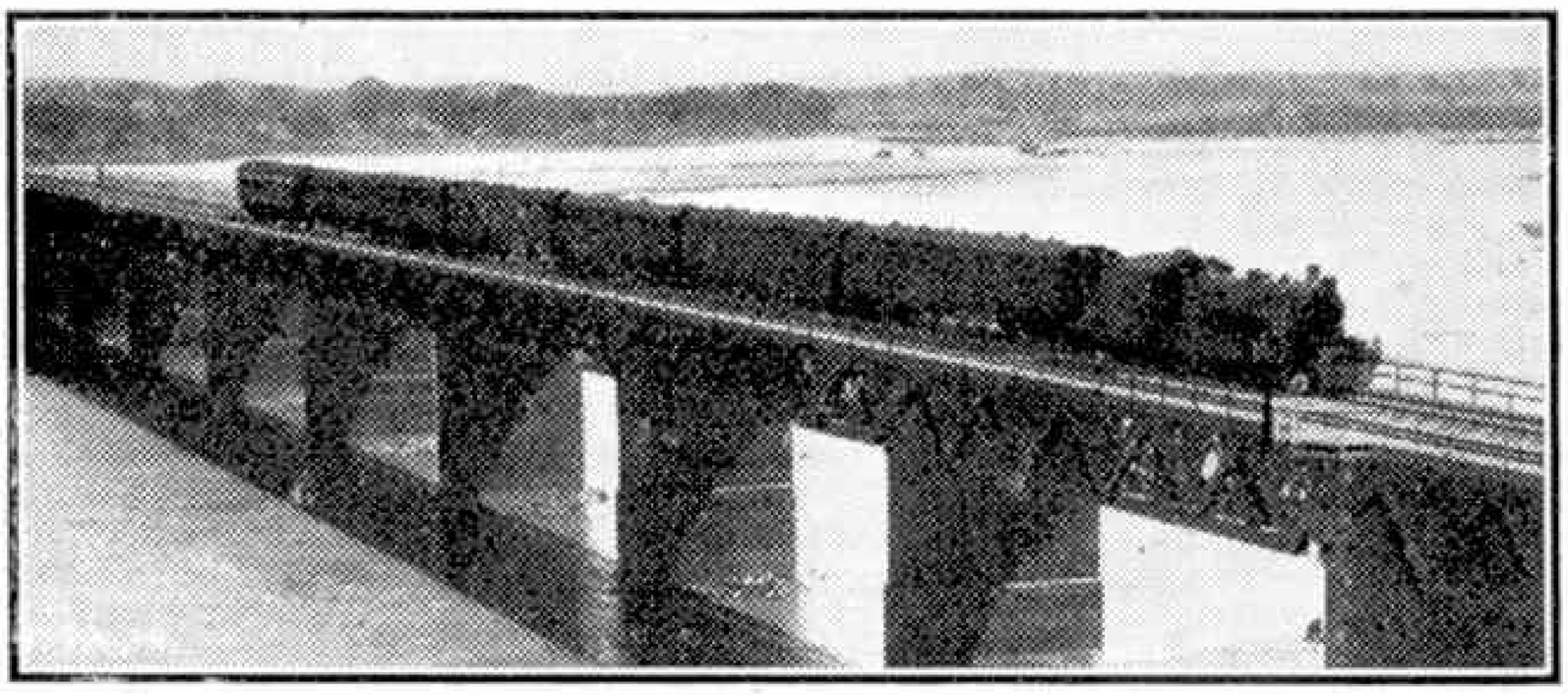
Before proceeding further however it will be as well to sketch out the directions of the great trunk lines of India. From Bombay the G.I.P.R. has three main routes—north-eastward, through Jubbulpore, to connect with the East Indian Railway at Allahabad; eastward, to link up with the Bengal Nagpur; and south-eastward, to Raichur, where connection is made with the Madras and Southern Mahratta. The G.I.P.R. operates, jointly with the East Indian Railway, the celebrated Imperial Indian Mail, between Bombay and Calcutta. The East Indian, together with India's largest system, the North Western, provides the great trunk route from Calcutta, up the valley of the Ganges, through the United Provinces, to the Punjab and the North-West Frontier. From Bombay a direct route to the north is afforded by the Bombay, Baroda and Central India system, which links up with the North-Western; while yet another vital link radiating from Lahore, the Capital city of the Punjab, is that running south-west to the well-known airport of Karachi, on the Arabian Sea. Finally, running southward from Madras to the very toe of the peninsula, is the South Indian Railway.

Although several of the Indian railways are now



4-cylinder heavy "Pacific" Class "XS1" fitted with Caprotti valve gear. Built for the North Western Railway by the Vulcan Foundry Ltd. to whom we are indebted for this illustration.

owned by the State, they were until about 15 years ago, operated by the original owning companies. The East Indian, for example, has been State-owned since 1879 but its operation was not taken over by the Government until 1925. As a result the various lines have the characteristics of individual separate concerns, and it is only lately that standard locomotives and standard rolling stock have been introduced. Under the direction of the Railway Board a series of standard designs of locomotives has been prepared to cover every requirement of the State-owned systems. For the 5 ft. 6 in. gauge lines three wheel-arrangements only have been selected—"Pacific," for passenger engines; 2–8–2 or "Mikado" for mixed traffic and fast freight, and 0–8–0 for mineral and heavy goods engines. A similar set of designs has been prepared for the metre and 2 ft. 6 in. gauge lines. Of "Pacifics" there are three standard varieties, designated "XA," "XB" and "XC"; the "XA" engines are for routes where only moderate axle-loads are permitted, while the "XCs" are used on the heaviest main line trains of the East Indian and North Western Railways.

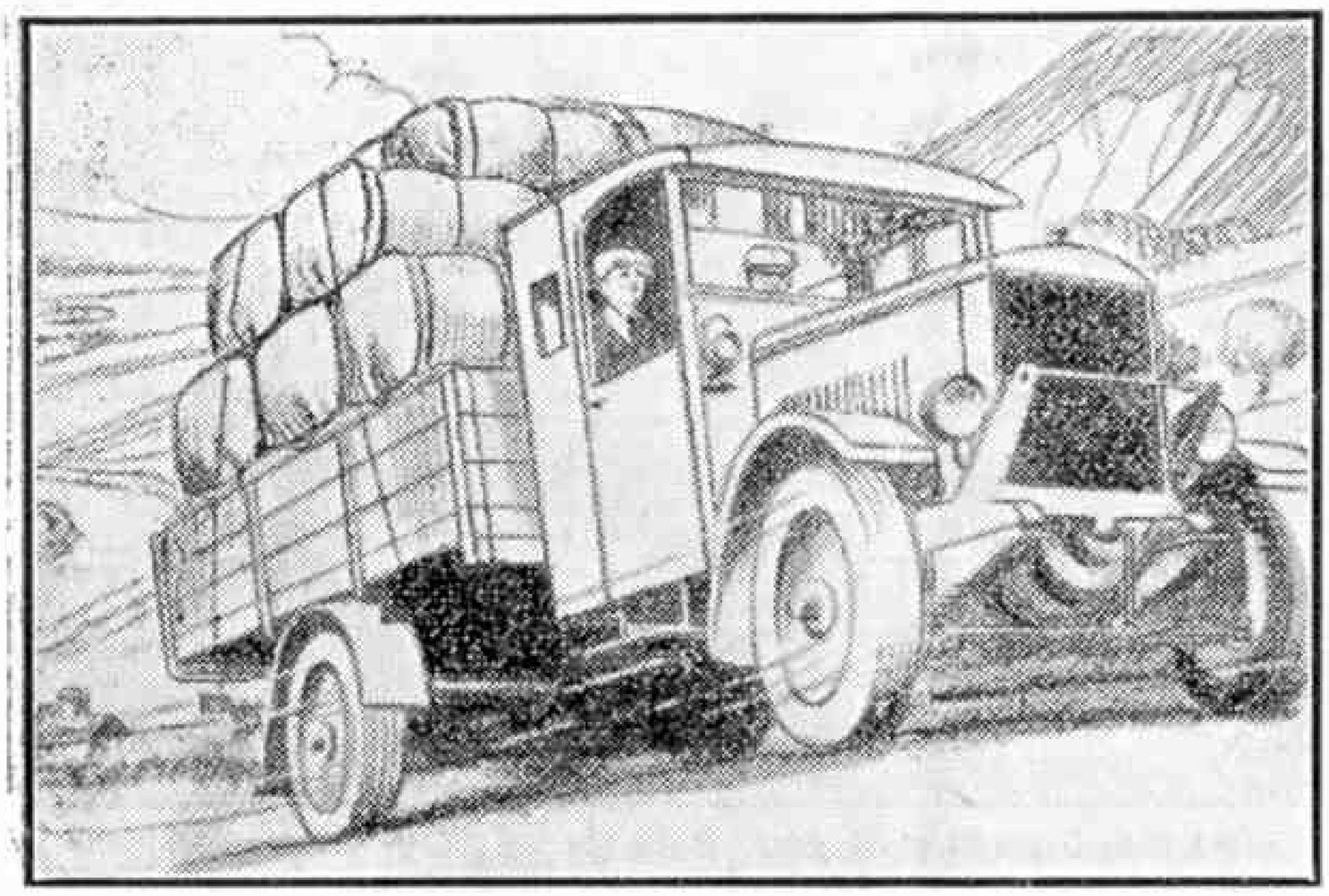


G.I.P. Railway. Lucknow-Bombay mail passing over Lucknow bridge near Cawnpore. Photograph by W. Stokes.

In tractive power and general dimensions the standard "XC" "Pacifics" correspond closely with the original low-pressure Gresley "Pacifics" on the L.N.E.R., except that the Indian engines have only two cylinders; these are 23 in. diameter by 28 in. stroke, and in combination with 6 ft. 2 in. coupled wheels and a boiler pressure of 180 lb. per sq. in. provide a nominal tractive effort of 30,625 lb. Like all locomotive types designed to the requirements of the Railway Board, they have broad fire-boxes designed to burn low-grade coal; the grate area is no less than 51 sq. ft. against the 41 sq. ft. of the L.N.E.R. 4–6–2s. The "XB" and "XA" classes of "Pacific" are arranged on generally similar lines, the "XB" having a tractive effort of 26,760 lb., and the "XA," with a surprisingly light total weight of 66½ tons, has a tractive effort of 20,960 lb. Later, and at the time of writing still experimental developments of the "XC" class, are some 4-cylinder engines carrying a higher boiler pressure of 225 lb. per sq. in.; some of these, which are classed "XS," are fitted with poppet valve-gear.

Several of the lines not yet owned by the State have begun to make use of the newly-standardised types, and the Bombay, Baroda and Central India, the only Indian railway to build locomotives, has in recent years constructed standard 2–8–2s, not only for its own use, but also for the Madras and Southern Mahratta, and the Assam Bengal. But to railway enthusiasts the non-standard designs are inevitably of the greater interest, as displaying the individual characteristics of the various companies; and among these the independently-owned Bengal Nagpur Railway provides some extremely interesting types. About 30 years ago, when the De Glehn compound system was attracting so much attention through its successful application to many French types, the B.N.R. purchased some very handsome "Atlantics"; these engines did remarkably well in India, so much so that the compound principle is still used in some of the very latest engines on the system. In 1929, when some large "Pacifics," designed generally on "XC" lines, were built by the North British Locomotive Co. Ltd., the De Glehn compound system was specified, instead of the two-cylinder simple propulsion. Furthermore, the boiler pressure is no less than 250 lb. per sq. in., making these engines among the heaviest and most powerful, for express duty, in India. Another interesting Bengal-Nagpur type is the 4–6–0 recently built by Robert Stephenson and Hawthorns Ltd.; in this the axle load was limited to 17 tons, yet by a skilful front-end layout a locomotive almost as powerful as the compound "Pacifics" just mentioned has been achieved.

Before leaving the matter of passenger train working on the principal main lines some mention must be made of the difficulties (*Continued on page 302*)



Magic Carpet—

New Style

By Garry Hogg

IN spite of wartime restrictions on travel by rail and coach it is still possible, with a little enterprise, to cover long distances cheaply and quickly. The following is an account of a trip undertaken to see whether a distance of over 500 miles could be covered in under five days, no stretch to be more than 30 or 40 miles long, and not more than a shilling or two to be spent on transport.

A bird's-eye view over the vast network of British roads, if such a thing were possible, would show at any hour of the day or night an enormous number of long-distance vehicles travelling steadily north and south and east and west. On these we largely banked, when planning the trip; it was just a matter of working out a route that would include as many main roads as possible—a very different thing from the pre-war planning of holiday tours "off the beaten track," when the dust and smell and noise of lorries were things to be avoided at all costs!

Our first successful "thumb" was a very modest one; an Austin "7" with a driver occupying, as it seemed, almost all of it, but very willing to let us and our ruck-sacks squeeze in if we could. But he was not going far, and soon we were perched on a gate looking back along a straight stretch of main road for a likely craft. We were soon lucky. A lorry carrying, apparently, a load of gas-cookers, hove into view, stopped at our signal, and was soon under way again with the two of us ensconced in the cab. The "gas-cookers" proved, on inquiry, to be a six-ton load of bombs being brought south for filling with explosive in London. The driver talked of his 900-mile round trip as though it were a run between tea and supper-time; but then it was indeed nothing out of the ordinary to him, for he does it regularly, week in and week out.

But we had planned a circular tour, covering a variety of roads and, we hoped, an even bigger variety of transport; so we dropped off at Manchester, took a tram through to Stockport to avoid the miles of hard and hot pavement, and tried another gate. This time we were picked up by a giant articulated lorry travelling empty at what seemed to us at first a fantastic speed, though it soon became evident that the driver had nothing to learn about the art of handling such a huge craft. He had been driving for 25 years, and had not lost the obvious delight of the expert in a powerful and responsive engine and chassis. We sailed round the great curves and S-bends of that north Derbyshire road, south to Buxton, swiftly and almost in silence save for the hiss and faint purr of the great engine beneath us in the roomy cab.

It was not all lorry-hopping, however. We had set our hearts on a lift in a Rolls Royce, and sure enough we were picked up north of Bath by a magnificent specimen complete with liveried chauffeur! We ran down the steep northern slopes into that lovely city of warm and mellow stone, bade farewell to our Rolls Royce, and left that same city—in an ancient lorry loaded with road-metal! That was a contrast indeed, but whereas we had hardly liked to speak in the Rolls Royce unless first spoken to, we were soon on the friendliest of terms in the lorry, and even helped the driver to eat his snack of sandwiches which, he assured us, his wife always cut for him in too great quantities.

One other lorry-ride was memorable. We ran through the Vale of Evesham on an open flour-lorry with trailer, travelling light. There was no room in the cab, so we settled down on the open dusty floor of the lorry, which, like its trailer, had neither sides nor tailboard. Its acceleration was so tremendous that once, when we were adjusting a pile of sacks to sit on, we were almost shot aft on to the trailer in one terrifying slither! Continual loading and unloading of heavy sacks of flour had worn the sheet-metal floor of the lorry to a glass-like surface like chromium-plating!

All the drivers spoke with approval, even with affection, of their craft. Ranging from giant articulated vehicles down to fast-moving vans no larger than some big cars, each had its merits. Their drivers knew their individual qualities—even mass-produced vehicles come to show such things in time—and usually undertook even large-scale repair jobs on them. Some spoke enthusiastically of the big American trucks they drove, others of some elderly British-built lorry which, though lacking the refinements introduced over 10 years or so of life, had a sturdy and lasting quality about it which they considered ample compensation.

There is no finer driver on the road than your lorry-driver. He is handling perhaps 15 tons of lorry and load, and steering-wheel and levers call for real muscular strength; but he is always prompt to warn following traffic that he is about to overtake, or slow down. His cab may be vibrating with the pulsing of his great engine, often mounted nowadays actually beside him instead of in front, and it may be so noisy that you can only guess at what he is saying; but he still shows the courtesy and consideration for other road-users that is not always found among drivers of private cars.

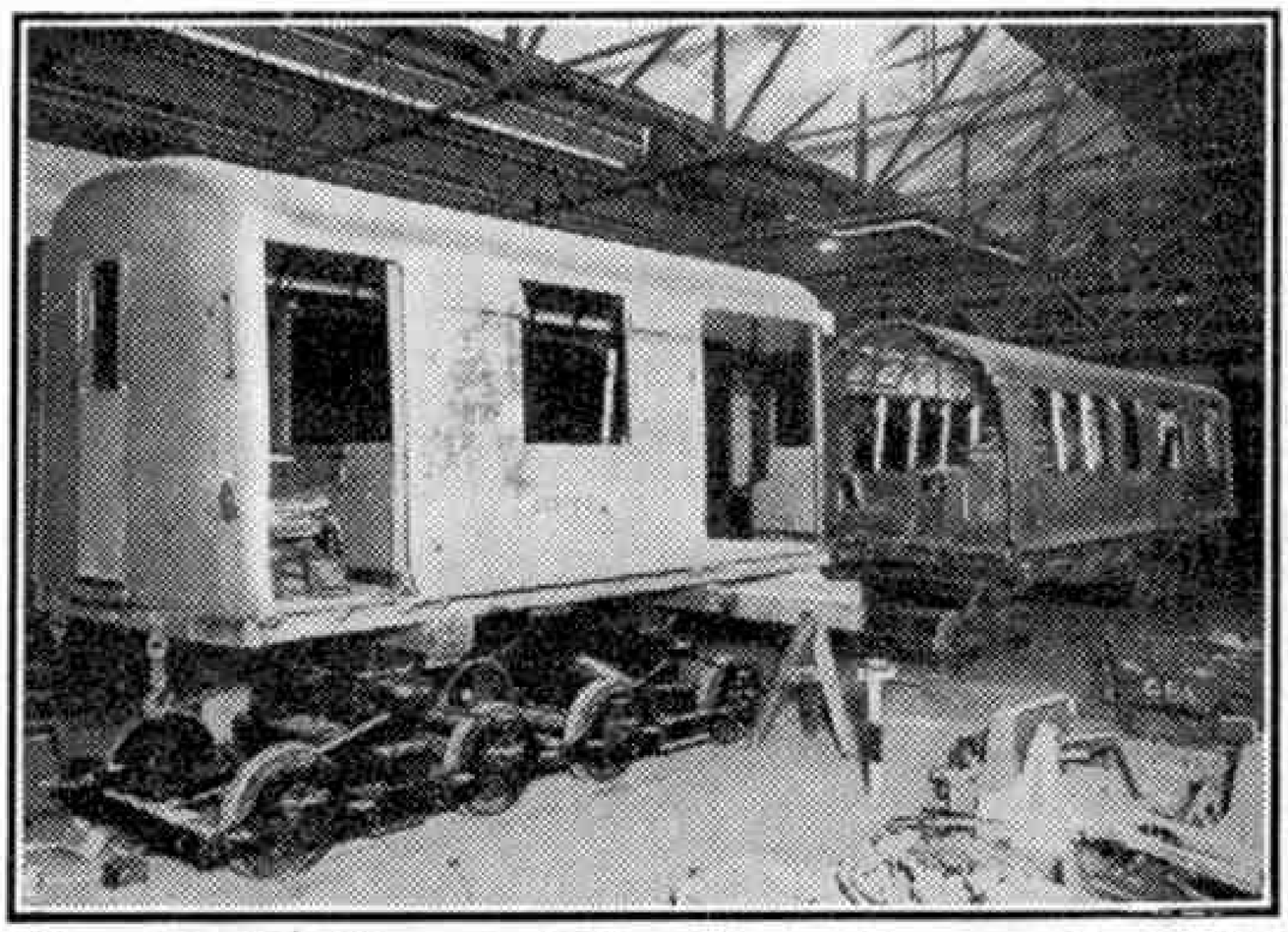
With the exception of Service vehicles, which may not give lifts to civilians, we sampled almost every type—33 vehicles in all. We travelled 535 miles, through nine counties, and of that total we walked just over 60, averaging nearly 15 a day. The longest lift was of 40-odd miles, between Bristol and Tewkesbury; a grand stretch that flew beneath our 12 wheels. But the average lift was only about 14 miles. We succeeded in our aim; the 535 miles were covered in four days and a half, and on fares we spent a mere 2/6 each—on trams and buses through three large cities. Such a range of "mounts," together with the opportunities yielded for practising patience and optimism, certainly adds spice to cross-country travelling.

A "Two in One" Underground Car

By T. R. Robinson

ONE of the oddest stories of London's "blitz" is surely that which tells of the adventures of No. 14233, an ordinary-looking passenger car in service on the District section of the L.P.T.B. Underground system.

During the heavy raiding of the autumn of 1940, a District trailer car, No. 013167, was hit and badly damaged, three quarters of its length being almost completely destroyed. The main passenger seating space, coachwork, and two sets of sliding doors, as well as the underframing and one bogie, were practically reduced to scrap metal, but one part of the coach remained almost untouched. As it stood, the car was hardly worth repairing, but a week or so later, by a strange coincidence, another car of a similar type, the Metropolitan motor car No. 14233, also was hit. This time only one end was wrecked, although the remainder of the body was somewhat distorted by bomb blast.



The salvaged portions of a Metropolitan motor car and a District Railway trailer car ready to be united to form a new one.

Passenger cars are valuable things, and are difficult to replace in wartime. As soon as the strange result of the two explosions was noticed, it was therefore suggested that it might be worth while to attempt to make one good car out of the two wrecked vehicles. Examination showed that the scheme was quite practicable, and so the cars were taken to the repair shops. There car No. 14233 had its damaged end cut off, all frame and bodywork members, including the solebars, being cut through vertically at a point just inside the first pair of double sliding doors.

With the damaged parts removed, work was put in hand to re-shape the distorted parts, the roof members being removed and re-set, and the sides pressed out to the correct shape. Then the corrected roof members were replaced and the incidental work necessary to make the car ready for its "opposite number" was carried out. While this was being done, car No. 013167 was cut through on the corresponding plane, and the good portion was preserved. This part was overhauled and re-set, and then all was ready for the matching up of the sections.

The two portions were lined up, and the solebars and main longitudinal members of the two vehicles were united by arc welding. In addition, cover straps were welded on over the solebar joints to give additional strength. The original roof sheets were next replaced, and it is interesting to note that only one new sheet, that at the actual point of joining, was required to complete the roof.

Interior fitting was then dealt with. The woodwork was largely salved from the two cars, and so were the majority of the seats and other incidental fittings. They needed repair, but sufficient of them were available in good condition to obviate any extensive call for new components.

Glass for the windows was probably the largest single item of replacement that was needed, and ceiling board and two sheets of steel panel were the only other major items required. After passing through the paint shop, the car was placed in service. When first turned out from the paint shop, it had two different numbers, one at each end, but it now bears the single number 14233.

It seems rather a pity that some permanent indication of the "splice" cannot be shown on the car, such as the placing of the number of 013167 in brackets below the main number, or the fitting of a plate giving the story in brief form. The buses that were lent to London from provincial centres were returned to their owners with plate attached. The story of this car is certainly worthy of similar commemoration, for it is a fine example of the way that London "took it," and refused to be broken by the blast of Hitler's "Luftwaffe." The car probably will be carrying Londoners to their work and back to their homes long after German air raids have become little more than a memory, and when only those who mean to travel are to be seen on the platforms of "London's Underground." Although few of the many thousands who have travelled in it have realised its strange story, it must be one of the most remarkable railway vehicles in existence.

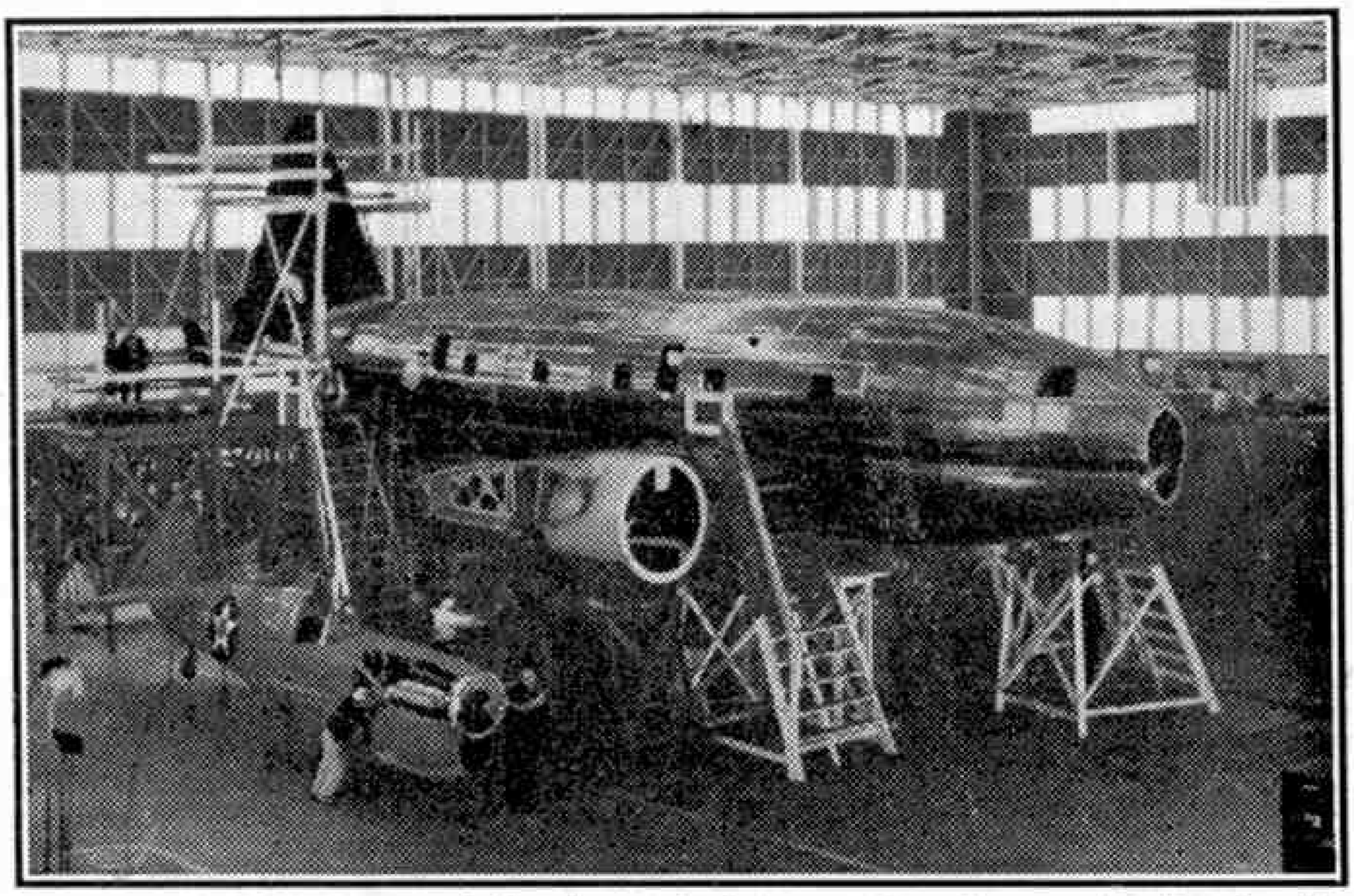
The finished car, numbered 14233, constructed from the remains of two cars severely damaged in an air raid.

Air News

Big Transport Aircraft for U.S. Army Air Forces

Curtiss "Commandos," the military version of the CW-20 "*St. Louis*," the largest twin-engined transport aircraft in the world, are being rushed to completion ahead of schedule by Curtiss-Wright Corporation, U.S.A., for the U.S. Army Air Forces. The photograph on this page shows the first "Commando" under construction, and an impression of the size it will be when fully assembled can be gained by comparing it with the partly-built bullet-like Curtiss "Hawk" P.40 fighter alongside it. According to the builders the "Commando" type will be able to transport many more than 36 fully-equipped infantrymen, light field artillery, or one or more light reconnaissance cars, to critical points in a battle zone at high speeds approaching those of twin-engined bombers.

In designing this new military transport special attention was paid to making it suitable for rapid quantity production, and with a high degree of interchangeability of parts. It will withstand rugged service, and can be repaired quickly in the field, even when it has suffered major structural damage. For instance, a crew of six can replace its 1,750 h.p. engines in a few hours, its wing panels may be replaced in 4 hrs. by a crew of eight without special equipment, a wing tip may be substituted in a matter of minutes, and the landing gear assembly may be replaced in a few hours by a competent crew.



The first Curtiss "Commando" twin-engined transport under construction for the U.S. Army Air Forces. Alongside it is one of the small P.40 single-seater fighters being assembled in the same factory. Photograph by courtesy of the Curtiss-Wright Corporation, U.S.A.

R.A.F. Exhibitions

A series of air exhibitions, each containing about 300 R.A.F. photographs and special working models illustrating the R.A.F. in action, is being held in the principal cities of Great Britain and Northern Ireland. Each exhibition remains open for about a fortnight. The first one opened at Bristol early in June, and since then others have been held at Sheffield, Newcastle, and Dundee.

Many of the photographs are large-scale enlargements of pictures taken over enemy and occupied countries, the Western Desert, Atlantic, Iceland and other theatres of war in the air. The R.A.F. Commands are grouped so as to show the characteristic activities of each one, and there are splendid photographs illustrating the work of the Air Sea Rescue Service, W.A.A.F., A.T.C., Royal Observer Corps, and allied services.

The models on view provide tests of ability in aircraft recognition, and exemplify the methods of bomb aiming, camera work and other technical processes, and include specimens of uniforms and decorations.

Awards for U.S. Raid on Japan

President Roosevelt has presented the Congressional Medal of Honour, the highest American award for valour, to Brig. Gen. James Doolittle for his fine leadership of the highly successful first American bombing raid on Japan. The raid took place on 18th April last, and great damage was afterwards reported to have been inflicted on production centres in Tokio and Nagoya. The 79 volunteers who flew with Doolittle were awarded the Distinguished Flying Cross.

In 1925 Brig. Gen. Doolittle, then a Lieut., won the Schneider Trophy Contest for the United States, when he achieved a speed of 232.57 m.p.h. in a Curtiss seaplane fitted with a Curtiss 600 h.p. engine.

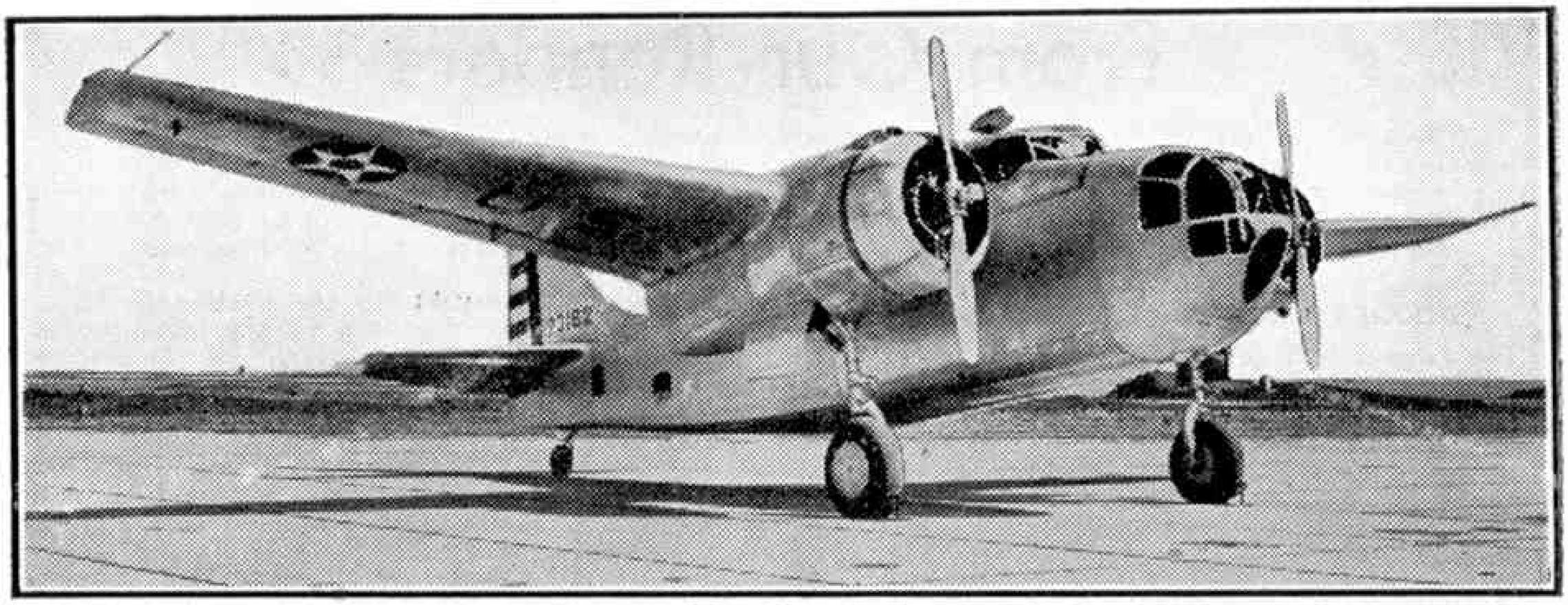
New Transatlantic Service

On 21st June last American Export Airlines began operating a regular transatlantic air service with their new Vought-Sikorsky 4-engined flying boats. The first round trip was flown by the boat named "*Excalibur*," and its passengers included Mr. Oliver Lyttelton, Minister of Production. The service is a successful climax to five years of repeated application for the necessary Government licence, which was finally granted to the company only a few months ago. These applications have been strongly opposed by Pan American Airways, before the war the only American operator of air services across the Atlantic.

The Vought-Sikorsky VS-44A flying boats are lighter and faster than the well-known "Clippers" of P.A.A., and each cost £140,000. The boats take off from La Guardia Airport, New York, and fly to Foynes, Eire, by way of Botwood, Newfoundland. A British shuttle air service is operated between Foynes and England.

* * * *

Trans-Canada Air Lines have begun a regular air service between Moncton, Canada, and St. John's, Newfoundland, as the result of an agreement made with the Newfoundland Government. Ten-seater aircraft are being used, and one flight in each direction is made on six days of the week. Air mail totalling 400 lb. was dealt with on the first day of the service.



The Boeing AT-15 Air Crew Trainer. Photograph by courtesy of the Boeing Aircraft Company, U.S.A.

Boeing Air Crew Trainer

The first Boeing AT-15 Crew Trainer for the U.S. Army Air Forces has been delivered for test. This new twin-engined machine is the first training aeroplane specially designed and equipped for the training of pilots, co-pilots, bombers, navigators, and gun crews. It has been produced by the Boeing Aircraft Company at one of its Middle West, U.S.A., plants.

The purpose of the machine is to give flight crews the training in co-ordination and teamwork so necessary before they take over tactical duties in multi-engined bombers. It is equipped with constant-speed airscrews, radio compass, automatic pilot, full complement of flight and radio equipment, flexible machine gun, flexible camera gun, power turret, and moderate capacity bomb bays. In fact it looks very much like a small twin-engined bomber, rather than a crew trainer. Provision has been made in it for crew members to receive individual instruction as well as group training.

Conservation of aluminium alloys and castings, critical materials needed in the production of aircraft destined for actual operations against the enemy, received special consideration in designing the AT-15. The machine is constructed of steel tubing with wood-faired, fabric-covered fuselage, and plywood-covered wings and tail surface. It has a wing span of about 59 ft. and is 42 ft. long. The two Pratt and Whitney engines give it a speed of at least 200 m.p.h.

Australian Hustle

A fine top-speed wartime construction job has been carried out in Australia, where an aerodrome claimed to be the greatest in that country has been created in four months by a civil construction corps working under the supervision of the Allied Works Council. About 2,500 men have been employed, and the project has cost about £3,000,000. Extensive hangars, assembly and repair workshops, and many other essential buildings have been built, a special branch railway to the site had to be laid down, and nearly 50 miles of roadway constructed within the area.

Enemy Aircraft Production in Occupied France

Many types of German aircraft are now being produced by the aircraft industry in Occupied France. They include Dornier Do 24 and Do 26 long-range reconnaissance flying boats, Focke-Wulf Fw 189 short-range reconnaissance machines, Junkers Ju 52s, Fieseler Fi 156 "Störch" and Messerschmitt Me 109F and 208 types.

Some types of French aircraft also have been ordered by the Luftwaffe, and include two Bloch designs—the 157 single-seater fighter, reported to be capable of 420 m.p.h. at 26,250 ft., and the 162 long-range bomber, said to be fitted with four Hispano type radial engines each developing 1,100 h.p. at 13,000 ft. Caudron "Goeland" communication aircraft are also being built for Germany.

Another Big Boeing Factory

A big aircraft factory under construction on the shore of Lake Washington, U.S.A., is to be operated by the Boeing Aircraft Company, producers of the famous "Flying Fortress" heavy bombers. It will be leased to them by the owners, the Defence Plant Corporation. The location of the new factory is reported to be excellent for the production of naval aircraft, as it is a fresh-water site, and is free from tides and currents.

* * * *

The Curtiss P.40 single-seater fighter has been named "Warhawk" in the United States. It will be known in the R.A.F. as the "Kittyhawk" II.

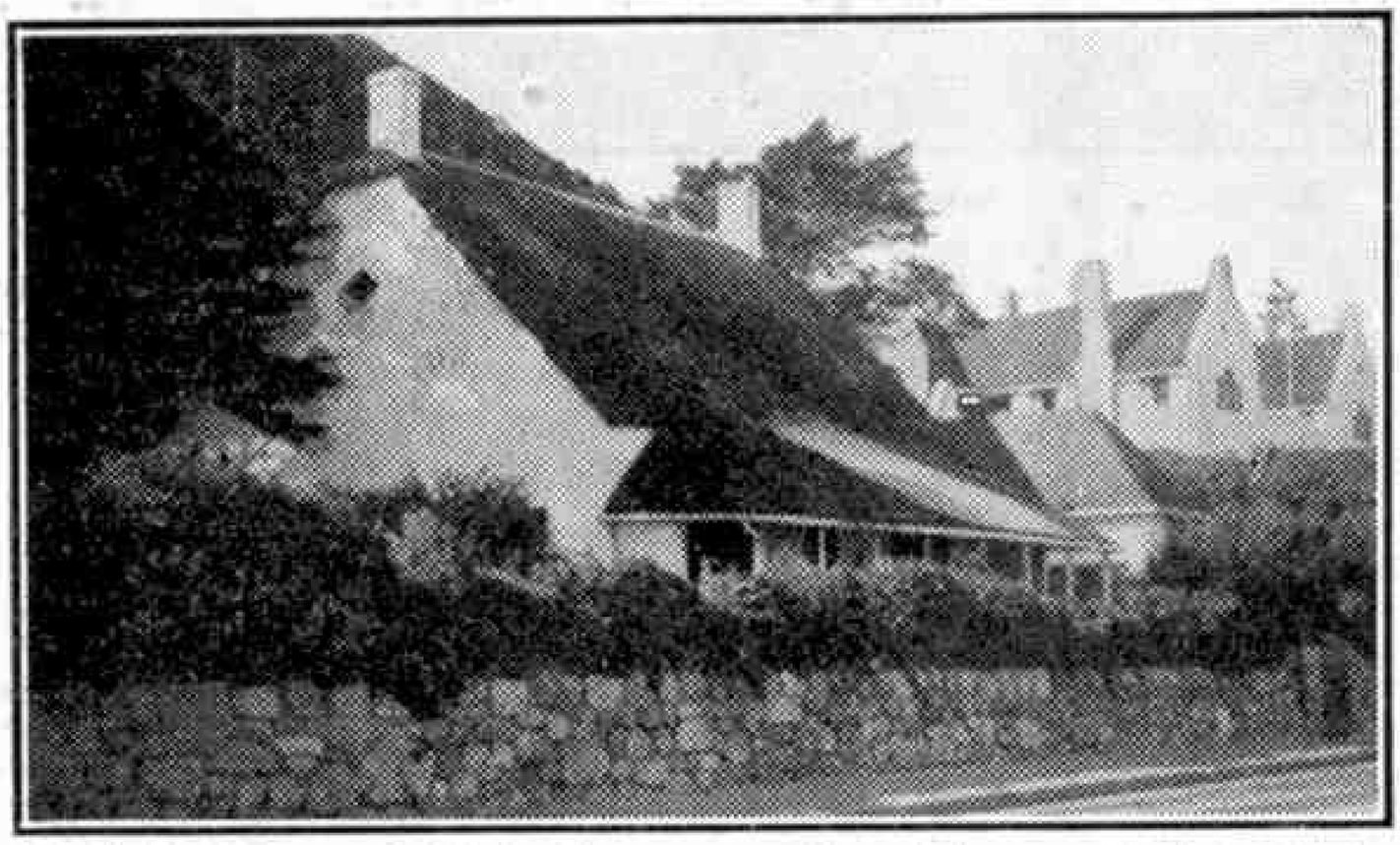
Facilities are now being granted to boys of the Air Training Corps to fly with experienced pilots of the R.A.F. This photograph shows some of these boys, guests of a Coastal Command station, gathered round a machine in which they were taken up on a non-operational trip.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

RHODES COTTAGE AT MUIZENBERG

The famous cottage at Muizenberg in which that great Imperialist Cecil John Rhodes lived is situated 16 miles from Cape Town. Muizenberg is a famous South African holiday resort, and thousands of people go there annually, yet few seem to be aware of this tiny cottage, facing the sea, which the South African Government have consecrated a National Monument.



Rhodes' Cottage at Muizenberg, near Cape Town. Photograph by I. Benjamin, Germiston, Transvaal.

The cottage was built during the 80's, and despite the ravages of time the original thatch is still on the roof. In fact, except for the electric lighting that has been installed, the cottage is in its original state. Its beautiful gardens show a colourful profusion of flowers set against the green of the trees and shrubs, and are well looked after. It fronts on the Main Road, facing the sea, and from it one can obtain a magnificent view of the whole sweep of False Bay, with Muizenberg's beach-front on the left and Kalk Bay on the right.

Rhodes was inspired by the vision of a great British Empire in Africa, and it was by his foresight and enterprise that Bechuanaland and the great stretch of country north of the Transvaal became British. His great work is commemorated by the name Rhodesia given to the land through which the Zambesi flows, and although he breathed his last in this little cottage he was finally laid to rest in the Matopo Hills in Rhodesia.

I. Benjamin (Germiston, S.A.).

THE MOLE TRAPPER

Moles do a certain amount of good in destroying a large number of worms, but they damage newly sown corn, crops and gardens by burrowing and throwing up their familiar mole-hills. The mole-hill is not the castle or palace where the little animal lives, but is simply the earth excavated during tunnelling; the castle is usually a larger mound, with galleries running around inside it and the nest or home at the centre of the base.

The mole is usually trapped by placing a special mole-trap in the tunnel. This has to be set lightly as the little animal, although nearly blind, has a wonderful sense of touch and quickly suspects danger. Sometimes it is caught on the surface by rabbit traps or dogs; the dog seen in the accompanying photograph accounted for several. Mr. Hodge, the trapper seen in this illustration, caught over 200 moles last season in the spare time left after completing his ordinary farm work.

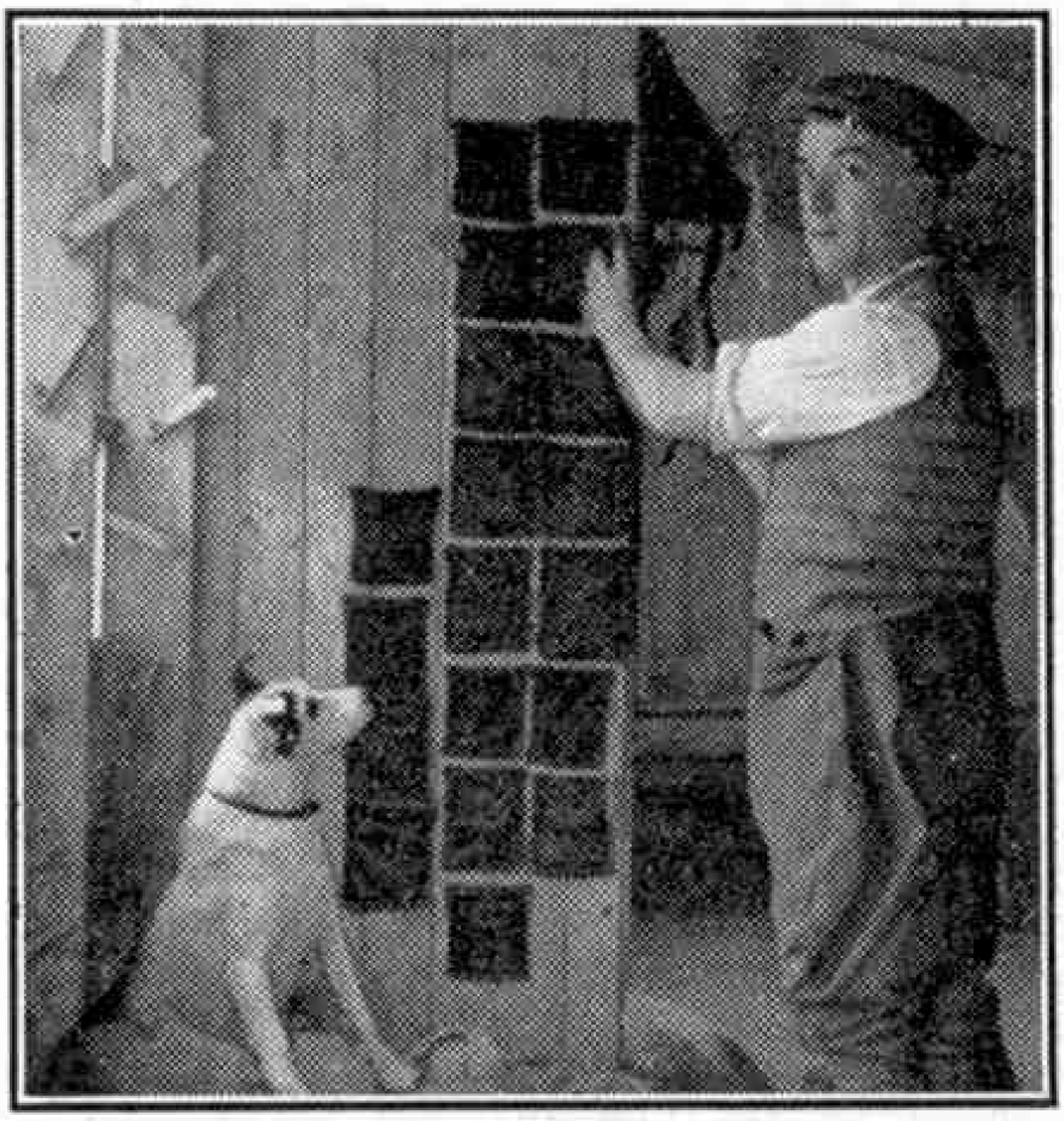
The short thick beautifully soft fur of the mole differs from most other furs in that it lies quite smoothly in any direction it is brushed, making it easy for the creature to move quickly in any direction. The skins when cleaned are stretched and nailed up to dry, as shown, and eventually are made into lovely warm fur coats. In the good old days when fancy waistcoats were worn, long before clothing coupons were thought of, it was quite the thing to have a mole-skin waistcoat, the owner often trapping the moles himself.

S. S. Pethybridge (Newton Abbot).

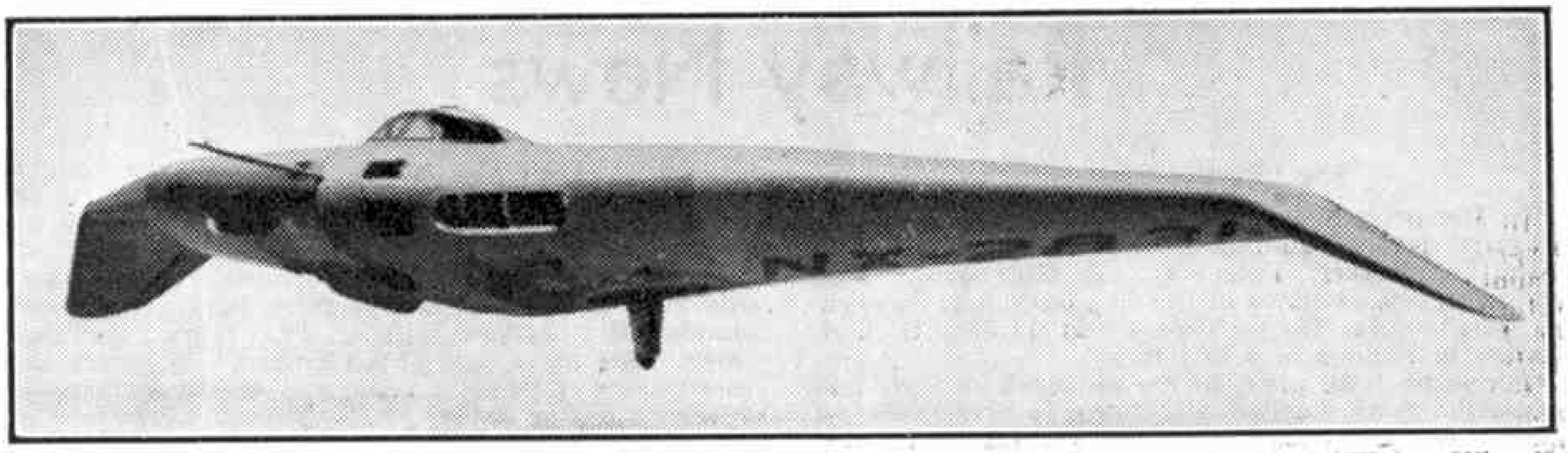
A CORNISH INVENTOR

Sir Goldsworthy Gurney, a famous Cornish inventor, was born at Padstow in 1793. He was intended to be a doctor, and he actually practised at Wadebridge, but he was more interested in science and invention than in medicine. Many of his inventions were worked out at Bude. He invented a system of flash signals and at the end of Bude breakwater stands the "Bude Light," which he erected. This consists of a strong iron pole on which is mounted a barrel painted a luminous white. His most famous invention was his steam carriage, on which he travelled from London to Bath and back at 15 m.p.h.

D. J. Wroe (Bude).



A mole trapper stretching and nailing up skins to dry. Photograph by S. S. Pethybridge, Newton Abbot.



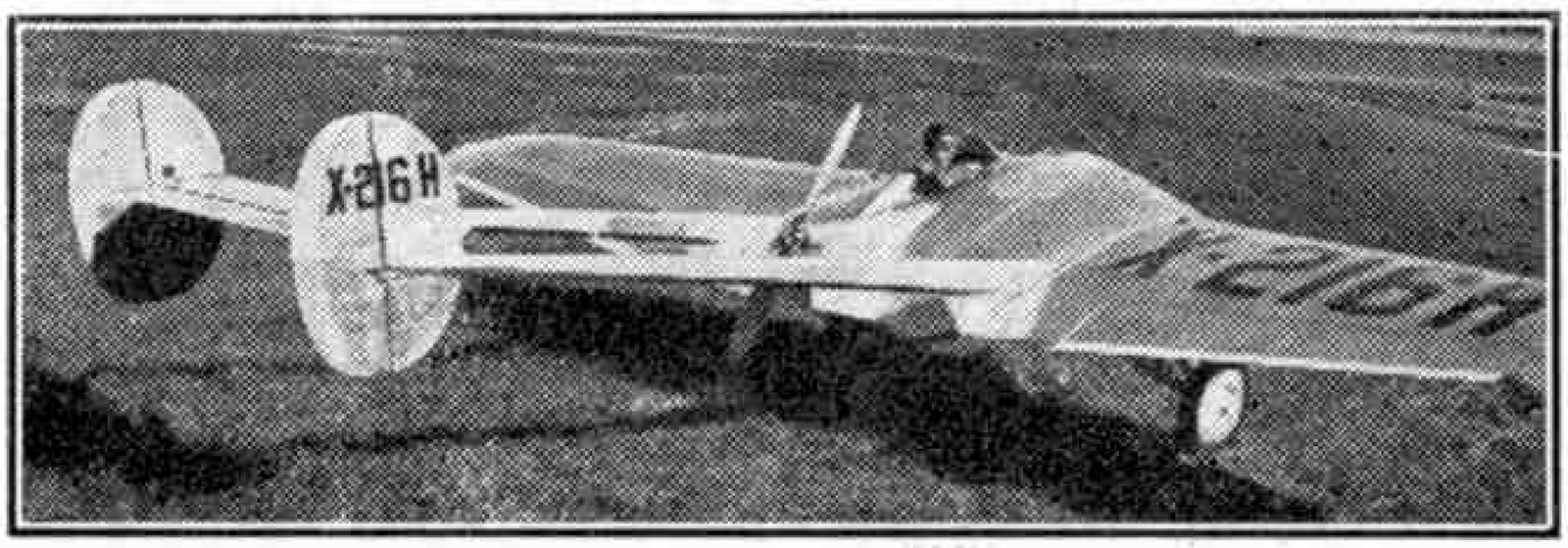
The latest Northrop "Flying Wing."

The Northrop "Flying Wing"

By Andrew R. Boone

FOLLOWING 18 months of test flying of the Northrop "Flying Wing," the machine has been declared successful by its designer and builder, John K. Northrop. This strange-looking machine is the result of almost 20 years' interest and study of the project by Northrop, who is President of the company bearing his name, and the designer of such notable aircraft as the Lockheed "Vega" transport, which had the first monocoque type of fuselage, and the Northrop A-17 attack aircraft.

In 1929 he supervised the design and construction of a so-called flying wing, but at that time did not undertake to build a tail-less aeroplane. The 1929 machine had ample space within the wing for crew and engines, and the tail surfaces were carried on two outriggers that extended to the rear of the wing. In the interval between



The first Northrop flying-wing type monoplane, built in 1929.

1930 and 1939 his interest in the flying wing type of machine continued, and the formation of Northrop Aircraft, Inc., in 1939 gave him the opportunity to resume his experiments.

With the help of the design staff of the new company, he began work on his new flying wing in July 1939, primarily to investigate the flight characteristics of such a design. After long research with wind tunnel models, and free flight model tests at the N.A.C.A. laboratories at Langley Field, the Northrop "Flying Wing" was developed. This first experimental machine was designed as a one-half to one-third scale model of a twin-engined transport or cargo aeroplane, and it is claimed to be the first successful true flying wing, as only the airscrew shaft housings, extending behind the wing, do not contribute directly to its lift.

Other types of tail-less aircraft have been constructed and flown in the past, but all have embodied some auxiliary control surfaces that were not part of the wing itself, and did not contribute to its lift.

The Northrop "Flying Wing" was first flight tested in May 1940 at Murco Lake Army Base, U.S.A., by Vance Breese, noted American test pilot. Commencing with short hops at an altitude of only a few feet and a length of about a mile, and progressing to the present unlimited flight capabilities, the craft has been flown on more than 200 occasions during the past year, utilising numerous modifications of aerofoil and control surface arrangements to determine the best combination.

The two engines buried in the wing, one on either side of the pilot, drive pusher airscrews through extension shafts about 10 ft. long, which connect the airscrews to the engines. The pusher installation greatly reduces the drag of the machine.

Railway News

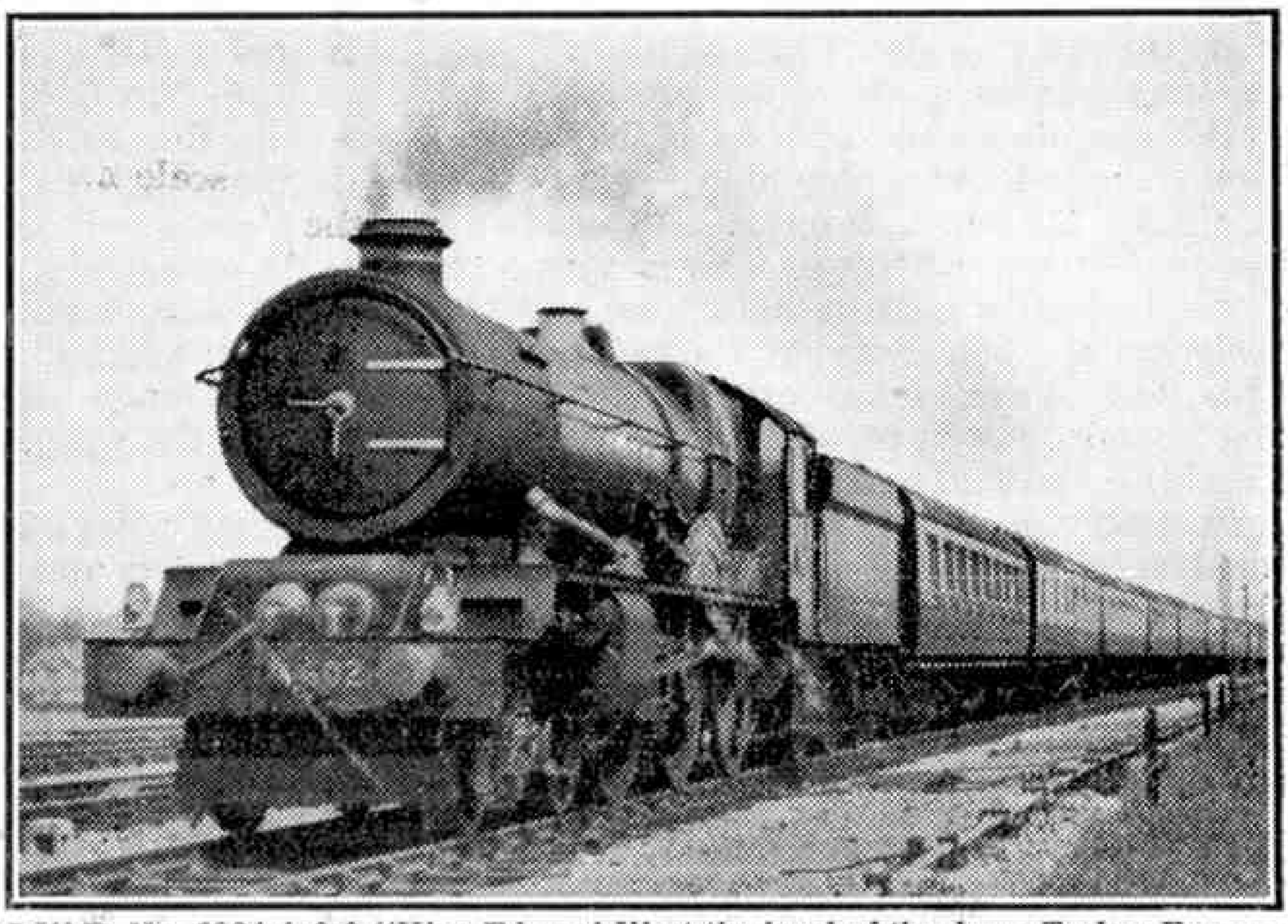
The "Torbay Express"

In the present emergency timetables the "*Torbay Express*" leaves Paddington at 10.40 a.m. and serves Taunton, Exeter, Paignton and Kingswear. The return service, stopping at Reading but not at Dawlish or Teignmouth, leaves Torquay at 11.55 a.m. and arrives in London at 4.50 p.m.

For some time prior to the outbreak of war, the departure from London and Torquay was made at noon. The westbound train was the fastest on the service, being allowed on ordinary weekdays only 169 min. for the 173½ miles from Paddington to the Exeter stop along a route presenting some steep gradients over short lengths, and traversing the Westbury and Frome avoiding lines. The whole load was conveyed through to Exeter or beyond, and varied according to season from 9 to 13 of the latest corridor coaches and restaurant cars, weighing 305-450 tons full.

"King" class engines regularly worked the Torbay service through between Paddington and Kingswear, with one set of enginemen stationed either in London or Newton Abbot. A local passenger was worked down from Newton Abbot to Kingswear, first, in the morning, or back from Kingswear in the evening after the through run from London. Newton Abbot is 193½ miles from Paddington and is the main line junction for the Torquay-Kingswear branch. From Kingswear a railway-owned ferry steamer crosses to Dartmouth.

On one occasion, about the time when our photograph was taken, No. 6022 "*King Edward III*," with a 13-coach train, was only about ½ min. late into Exeter notwithstanding signal checks before Reading from the closely preceding 11.55 Paddington-South Wales express, and a severe relaying slack. These delays cost in all some 7 min., so that the net average speed was 64 m.p.h. throughout.



G.W.R. No. 6024 4-6-0 "King Edward I" at the head of the down Torbay Express climbing to Whiteball summit. Photograph by T. W. Male, Uxbridge.

Record Non-Stop Run for L.M.S.

The L.M.S. claim the world's long distance non-stop record on behalf of two trains that run non-stop between Crewe and Glasgow, a distance of 243 miles. These are the 9.15 p.m. from Euston to Glasgow, and the 9.30 p.m. from Glasgow to Euston. The records for non-stop runs performed at regular intervals also is almost certainly held by the L.M.S., for once a week a relief train is run from Euston to Carlisle, 300 miles, without stopping.

The L.M.S. also holds the British record for the number of daily non-stop runs of more than 100 miles. The total is 53, increased on Fridays to 61, and the runs are made mainly over the West Coast Route. In addition to the record runs already mentioned, other noteworthy runs are one of 229¼ miles from Crewe to Motherwell, another of 183 miles from Stockport to Euston and the third of 177 miles from Euston to Wilmslow. The first of these runs is made by the 7.20 p.m. from Euston to Perth, and this also exceeds the present known overseas record.

The 9.15 p.m. from Euston to Glasgow, one of the trains that create the world's distance record, begins its remarkable journey by making a non-stop run of 158 miles from Euston to Crewe. The 9.10 p.m. train from Glasgow to Euston also makes a journey of outstanding interest, for this comprises three non-stop runs of more than 100 miles each. They are successively Glasgow-Carlisle, 103 miles, Carlisle-Crewe, 140¼ miles, and Crewe-Euston, 158 miles, the intermediate stops being made only to change engines or relieve engine crews.

The World's Longest Railway Ticket

What is probably the longest railway ticket ever sold was recently issued in Philadelphia by the Baltimore and Ohio Railroad. It was 14 ft. in length, and it cost $25. 72, or about £6 10s. a foot. It was issued to Jacob Mitnick, clothing inspector for the U.S. Army Quartermaster in Philadelphia, who required it for a tour of the clothing plants supplying the army. The tour will last six months and the holder of the ticket will pass over 18 different railways.

The length of certain American railway tickets has always astonished those accustomed to the small tickets issued in Great Britain. The reason for their use is that in the United States a separate coupon is issued for every section of the journey over the lines of different companies, and these are joined together. Thus a traveller from a point in say Wyoming to one in Georgia, a journey that will take him over the tracks of several different railways, may find that he is issued with a ticket about a yard in length. This is far shorter than the ticket referred to above, which is the longest ever sold by the Baltimore and Ohio Railroad.

L.M.S. Locomotive News

New standard 2–8–0 freight engines have recently been noted at work numbered in various series of 81xx batches, also 4xx and 6xx. Considerable L.M.S. freight traffic is worked over the L.N.E.R. main Tay Bridge route, in the hauling of which former Caledonian 0–6–0 locomotives have been prominent. Other news from Scotland is of "Royal Scots" working between Perth and Dundee, and also to Stranraer.

A Good "Sandringham" Run with a Heavy Load

Hard work is entailed in running some of the Great Eastern section expresses of the L.N.E.R., as the stops are usually more numerous than in normal times while loads are heavy. One of the "Sandringham" class 3-cylinder 4–6–0s No. 2817 "*Ford Castle*," which has always been stationed at Cambridge, had to work a 470-ton train consisting of 14 corridors from there to Liverpool Street on practically a peacetime schedule with three stops, at Audley End, Bishop's Stortford and Broxbourne respectively.

Time was kept uphill to Audley End, speed averaging 41½ m.p.h. up the 1 in 135-163 between Chesterford and Littlebury. After a short easy stretch, met at the restart, comes a long pull partly at 1 in 176 to the summit of the route near Elsenham, up which the average was 36 m.p.h. A service slack at Stansted prevented much advantage being taken of the sharp fall before the stop at Bishop's Stortford. The Broxbourne call, as well as signal checks before and after, similarly handicapped the long gentle descent to the London outskirts. The present temporary 60 m.p.h. limit was adhered to, but the train was almost punctual on passing Tottenham and could have been in to time but for further checks in the congested and steeply-graded East London suburban area between Clapton and Liverpool Street.

It is pleasing to record that on this journey, with a full complement of passengers, some time was economised at each station stop. The "Sandringham" class engines are now nearly all on the G.E. section and adjacent routes, for which they were originally built; the number operating in the Great Central area has lately been considerably reduced.

A King's Cross-Leeds express, on the former G.N. Section of the L.N.E.R., hauled by former G.C. locomotive No. 6165 4-6-0 "Valour." When our photograph was taken the engine was still in G.C. colours, and carried its former number 1165.

A Season Ticket Holder for 68 Years

A remarkable record was established by the late Mr. J. P. Firmston, J.P., one-time Mayor of Barnes, Surrey, who up to the end of 1941 had been a season ticket holder continuously on the London and South Western and Southern Railways for 68 years!

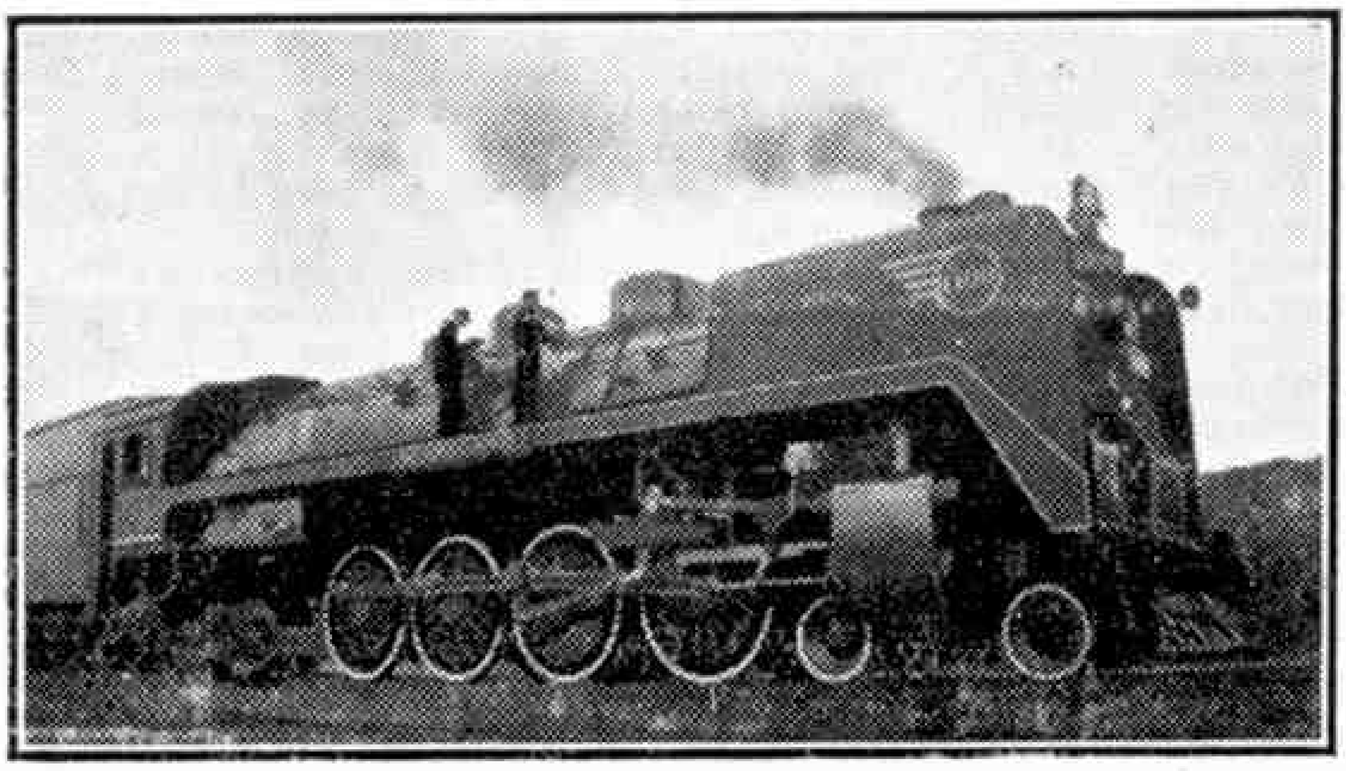
S.R. No. 934 "St. Lawrence"

The S.R. announces that "Schools" class 4–4–0 locomotive No. 934 "*St. Lawrence*," which received a direct bomb hit on the tender during an intensive night raid on London, was repaired and returned to service in gleaming bright green livery. During the recent visit to this country of the Soviet Trade Union Delegation, the Chairman of the Russian Railwaymen's Society and an official interpreter travelled on the footplate of No. 934 in the course of a visit to South-East England. This engine is stationed at an Eastern Section London depot. The "Schools" Class locomotives were introduced specially for Eastern Section duties 12 years ago.

A New Standard Locomotive Class.

The Indian Railway Board has adopted as a standard for future shunting locomotives, the "WW" 0–6–2T type as recently built by the English Vulcan Foundry Company for the North-Western Railway of India. These tanks have two outside cylinders, 16 in. diam. with 22 in. stroke, 8 in. piston valves and Walschaerts gear. The Belpaire boiler is pitched high and well proportioned: it presents somewhat unusual features for an engine of this type in having an 18-element superheater and boiler pressure as high as 210 lb. per sq. in. The adhesion weight is 49 tons, and the total weight in working order 66 tons. Curves of 190 yds. radius can be negotiated and the axle weight does not exceed 16½ tons.

Welding has been extensively employed in construction in order to save weight. The main frames are made of steel plates; boiler tubes are of solid drawn steel. Equipment includes Wakefield sight feed lubricator, steam and hand brakes on engine, together with vacuum ejector for train working.



The "Quintland Special," headed by Temiskaming and Northern Ontario Railway locomotive No. 1100 "Quintland." Photograph by our reader, W. R. Forder, Ontario, Canada.

The "Quintland Special"

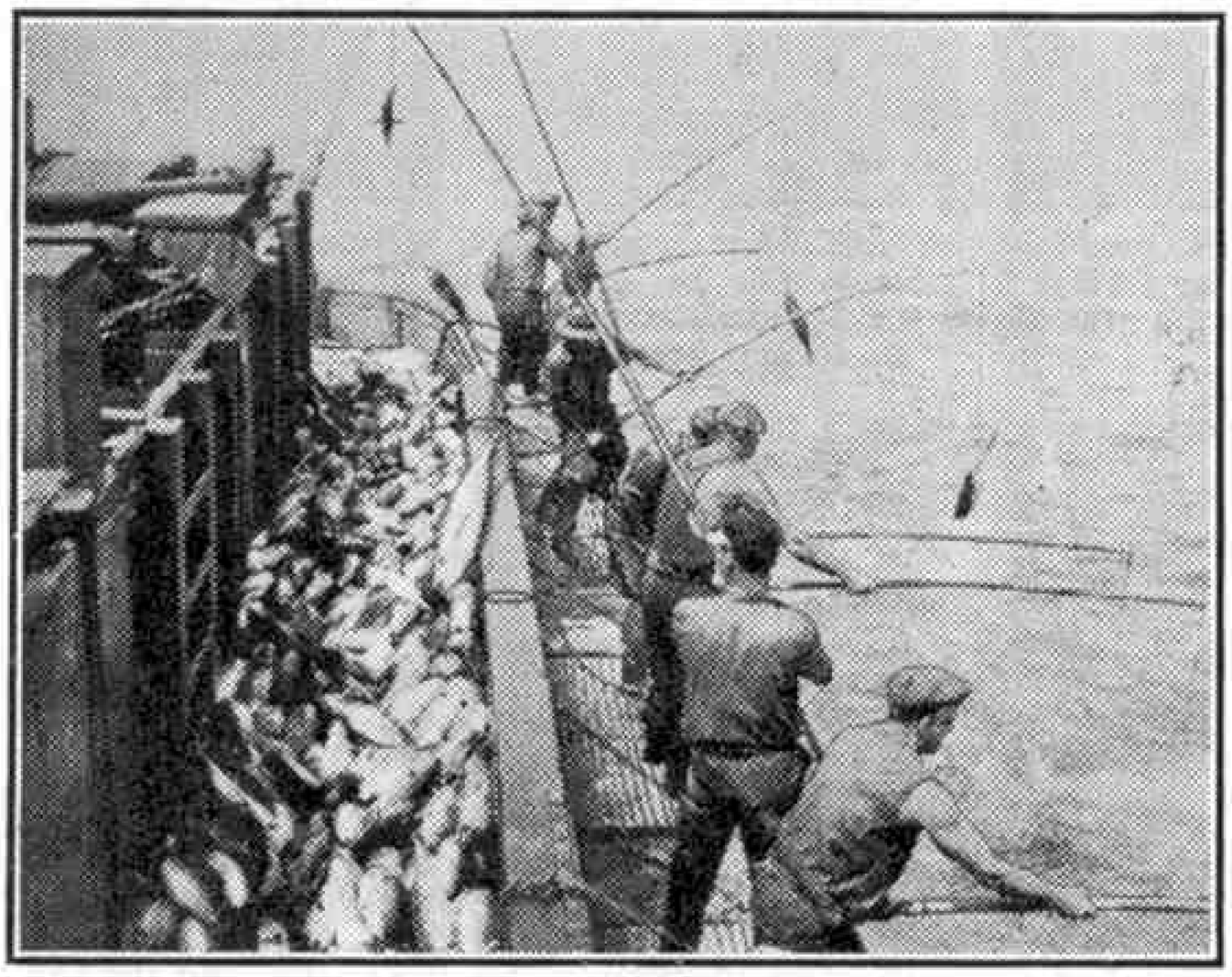
The accompanying illustration shows the "*Quintland Special*," the train in which the Dionne quintuplets travelled to Toronto to be presented to the King and Queen during their Canadian tour in 1938. The quintuplets live at Callender, near North Bay, Ontario, an important railway junction on the Temiskaming and Northern Ontario Railway. The train was hauled by T. and N.O. 4–8–4 locomotive No. 1100. As will be seen from our illustration this engine carried the name "*Quintland*."

Tuna Fishing on the High Seas

By Harry C. Godsil

IN the years immediately before the War the sport of tunny fishing in the North Sea attracted widespread interest. This fish is chiefly met with in the Mediterranean, where it has been caught for food since earliest times, but at times it wanders out into the Atlantic and round our coasts, where fish up to 950 lb. in weight have been taken. A relative of the tunny that frequents the Pacific Coast of the United States is known there as the tuna. It grows to immense proportions, and is the foundation on which a vast fishing industry has been built.

Tuna vessels scour the eastern Pacific from Southern California to the Equator, covering a belt from the American mainland to about 800 miles offshore. They are dependent upon two species of tuna, the yellowfin and, secondarily, the skipjack. These have similar habits and the same distribution, and not infrequently school together, so that in reality they constitute a single fishery and are taken indiscriminately by the same vessels. The yellowfin is the mainstay of the fishery and commands a higher price. In consequence it is mainly sought. Skipjack are taken only incidentally, or when yellowfin are scarce or skipjack are in great abundance and offer the possibility of a short trip, for skipjack do not keep as well and the losses from spoilage on the longer trips are greater than with yellowfin. Skipjack are marketed as striped tuna and yellowfin as light meat tuna.



Tuna fishing in the Pacific. The deck alongside the live bait tank is being filled rapidly with skipjack, or striped tuna.

Both species are taken with the same kind of gear, differing only in weight and strength. This consists of a bamboo pole with a hook at the end of a six-foot line. The pole averages 8 ft. to 9 ft. in length, varying with the size of the fish and the preference of the fisherman, and the base is of a size to afford a good firm hand grip, approximately 2 in. or less in diameter. The taper is upward and at the end the pole is perhaps $\frac{3}{4}$ in. to 1 in. in diameter. The joints of the segments are rasped smooth, and at the end of the pole is a loop of heavy linen line, to which the short line is knotted.

The actual line is in two parts. A $2\frac{1}{2}$ to 3 ft. length of heavy cotton line is fitted to the linen loop and to this is fastened a 2 ft. wire leader that bears the hook. The attachment of line to leader may be direct, by looping the eye of the leader through a bight in the line, or it may be indirect, through an intermediate spiral coil of heavy wire. There are probably as many ways of attaching the leader as there are boats in the fleet, but in all cases the leader is so fastened that it can readily be changed. It is never knotted.

The wire leader is invariably in two parts of unequal length, fastened permanently eye to eye. The shorter piece bears the hook and is usually about one-third the total length. This prevents undue kinking. Two types of hooks are used, in sizes to suit the fish taken. One is a plain galvanized barbless hook, which is inserted through the back muscle of a sardine or anchovetta when fishing with live bait. The other is a similar hook with the shank embedded in tubular brass filled with lead, with feathers projecting beyond the hook. This is known as a squid, or striker, and is used whenever the fish will take this lure, as it makes for faster and easier fishing.

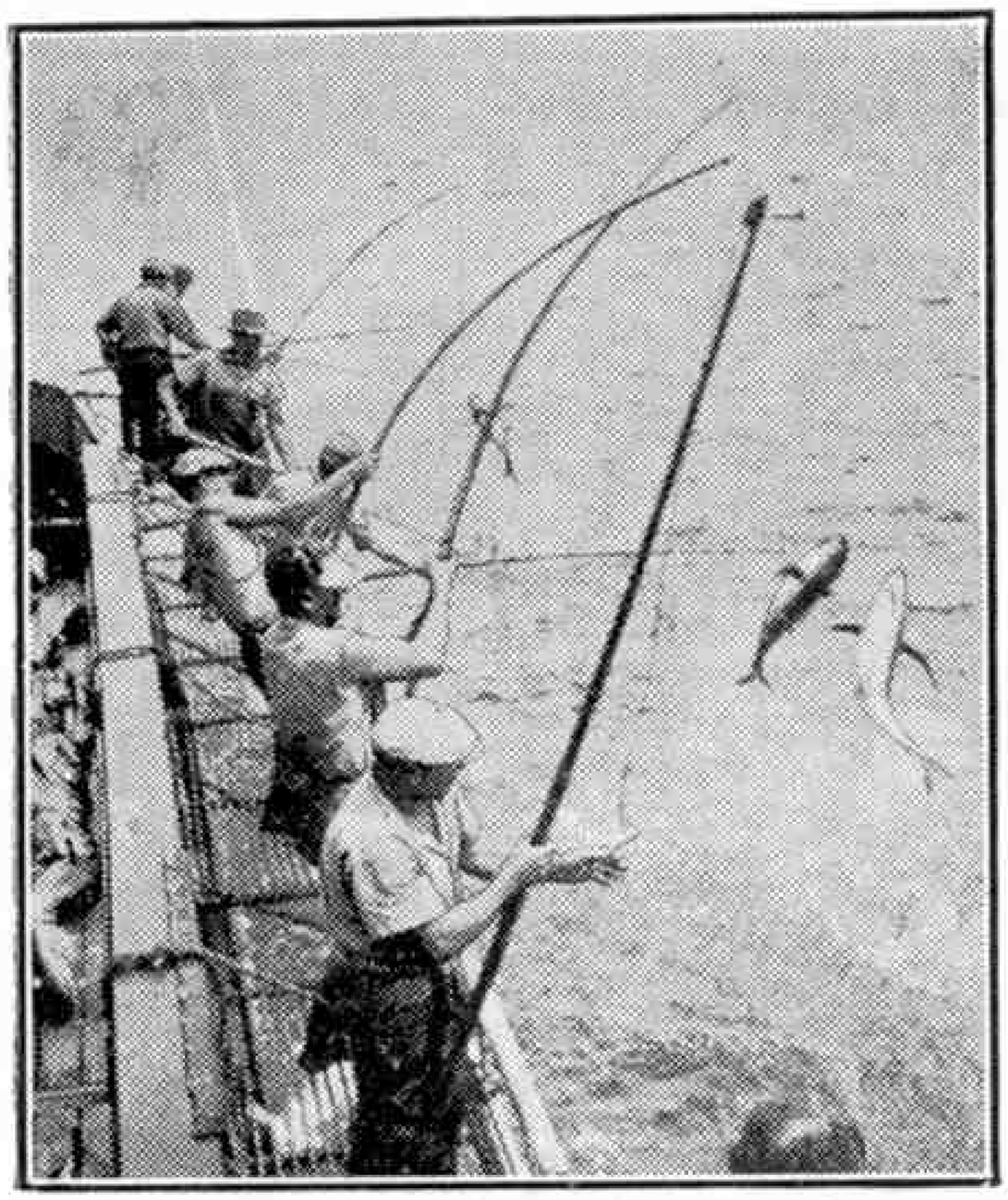
Yellowfin tuna range in size from a few pounds to several hundred, though these largest fish are seldom seen. Limits have been imposed restricting the commercial catch to fish between $7\frac{1}{2}$ lb. and 150 lb. The skipjack is a smaller fish and rarely attains a weight of 30 lb.

With this large range in commercial sizes, the gear used must necessarily be adapted to all sizes of fish, so with fish up to 20 lb. or 30 lb. in weight, each man fishes individually with his pole and line. With fish above 30 lb. the crew pairs into teams. Each member of a team retains his pole, but the cotton lines from both poles are linked by means of swivels to a common metal ring, from which a single hook and leader hangs by a third swivel, so that in reality two men, through two poles, are fishing the same line. This is known as two-pole fishing. With fish above 50 lb. or 60 lb. three lines meet in a common ring and a single hook. Still larger fish are taken with four and five lines running from as many poles to a common hook and leader, thus making four and five-pole teams.

This teamwork takes practice and co-ordination, and at best it is back-breaking work, as each fish must be lifted clear of the water and swung over the 34 in. rail. But the speed with which a well-drilled team can land their fish is hard to equal by any other means.

Because of the large size of tuna, and because these fish must be lifted from the water and swung aboard, the tuna boats have main deck down aft to within inches of ocean level, and fishing is done from racks overside, hinged to the guard rail. These racks are about 6 ft. long by $2\frac{1}{2}$ ft. to 3 ft. wide, and they are constructed of steel rods welded to heavier end pieces. On the outboard side of each is a knee-rest, about 16 in. to 18 in. high. The racks are so constructed that when not in use they fold up against the bulwarks, with the knee-rest overlying the rail. In this position they are clear and out of the way at all times. For use they are swung out and retained in a horizontal position by chain supports.

Tuna and skipjack are schooling fish and their presence may be detected in a number of ways. At times the fish break water, leaping clear. At other



Hauling yellowfin tuna aboard. One of the fishermen is seen baiting his hook with a live fish.

times when near, but not breaking the surface, they cause a dark and ruffled spot, which on a calm day can been seen at a considerable distance. Sometimes the presence of a school of fish is revealed at great distances by a flock of birds working overhead. It appears that the tuna in pursuit of food will drive their quarry to the surface. Knowing this the sea birds gather overhead, swooping down when the opportunity serves to pounce upon whatsoever food they can secure. Thus to the tuna fisherman the sea birds are a blessing, for "working birds" invariably mean fish. In southern waters tuna are often found with porpoise, so that a tuna boat never passes a school of porpoise without investigation.

When a school is sighted, the course is changed to intercept the fish. On near approach the vessel is slowed, and simultaneously bait from the tanks is thrown overboard. This is the duty of the chummer. On some boats there is only one chummer, but on most large boats there are two. These men are in charge of the bait. It is their responsibility to keep the tanks cleaned and siphoned and in good repair, and to feed and generally take care of the welfare of the bait. Approaching a school of tuna, they impound a supply of bait within a small "flag," or blanket net in the coaming of each tank. As soon as the engines are throttled down, they dip from the tank with a small hand net half a dozen live fish—sardines, anchovettas, or whatever bait they have—and throw these individually or collectively overboard to attract the tuna to the boat.

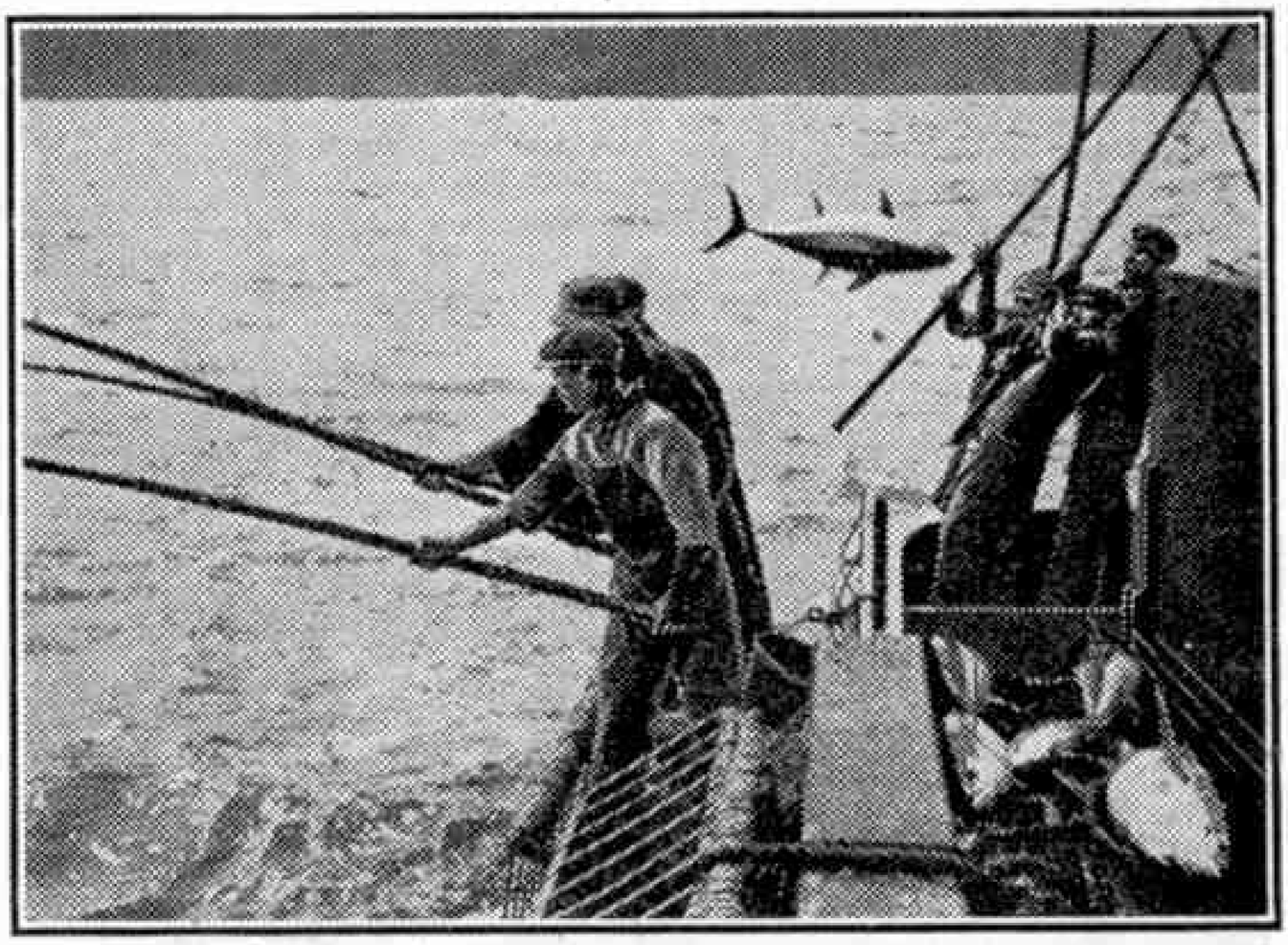
Meanwhile the crew is standing by, and all eyes are focused on the wake of the vessel watching for the "breaks." If the tuna are "biting," they will swoop on the bait with incredible speed, and this rush causes an eddying "slick" on the surface. With the first "break" the engines are stopped, and the men clamber overside into the racks with either one, two or three-pole gear, depending on the estimated size of the fish.

Fishing begins immediately, or as soon as sufficient way is lost, for no man can stop the rush of a large tuna with the vessel moving fast. Each fisherman stands loosely braced with one knee against the support on the rack, and a foot back against the hull. The base of his pole rests in a leather pad, and one hand grips the pole near its end while the other extends about shoulder high and holds it farther out. The tip is lowered until the hook is immersed a foot or so in the water, and trailed when the boat is moving. When the vessel finally stops, the pole is moved in short arcs so that the feathered striker simulates a living fish.

Meanwhile the chummers heave bait overboard continuously and the tuna, if they are biting, take living bait and strikers indiscriminately. The eyes of every fisherman are glued to his striker, and as a fish strikes the fisherman leans back on his pole, utilising the initial rush of the fish to lift it out of the water and swing it aboard. The reason for the exclusive use of barbless hooks is now apparent, for as the fish comes hurtling through the air the fisherman suddenly relaxes his tension on the pole, and twice out of three times the hook falls clear of the fish, which hits the tank and drops free into the alley.

Back goes the striker into the water. In a fast-biting school there is a steady rain of fish on the decks, and it is not uncommon to take 30 or 40 tons in an hour or two. One case is on record where a single boat took over 100 tons of tuna in a single day.

At times tuna will devour the chum voraciously but will not touch a striker. At such times live bait is used on a plain hook. In the rail aft, and extending 10 in. to 12 in. into the broad bulwarks of the vessel, are several little wells, one or two to each fishing rack. These are supplied by gravity flow with running sea water from the bait tanks. The chummer, or usually a fisherman designated to this job, passes to each fisherman a small scoop full of bait, which the latter dumps into the nearest little well in the rail. Taking a single fish, he then baits his hook and proceeds to fish as already described, except that the pole is generally held still, allowing the bait to swim as it will.



Three-pole fishing for large tuna, which are too heavy to be swung aboard by one or even two men. With one hook attached to three rods the men work together in teams.

Fishing with live bait on the hook is considerably slower than the striker method, and is used only when the squid fails.

Sometimes the tuna will take the chum but will touch neither the striker nor the live bait. At other times they will not even condescend to touch the chum thrown out, and there is no alternative but to leave the school in search of others or even go elsewhere.

Engineering News

An Underground Train for Coal Miners

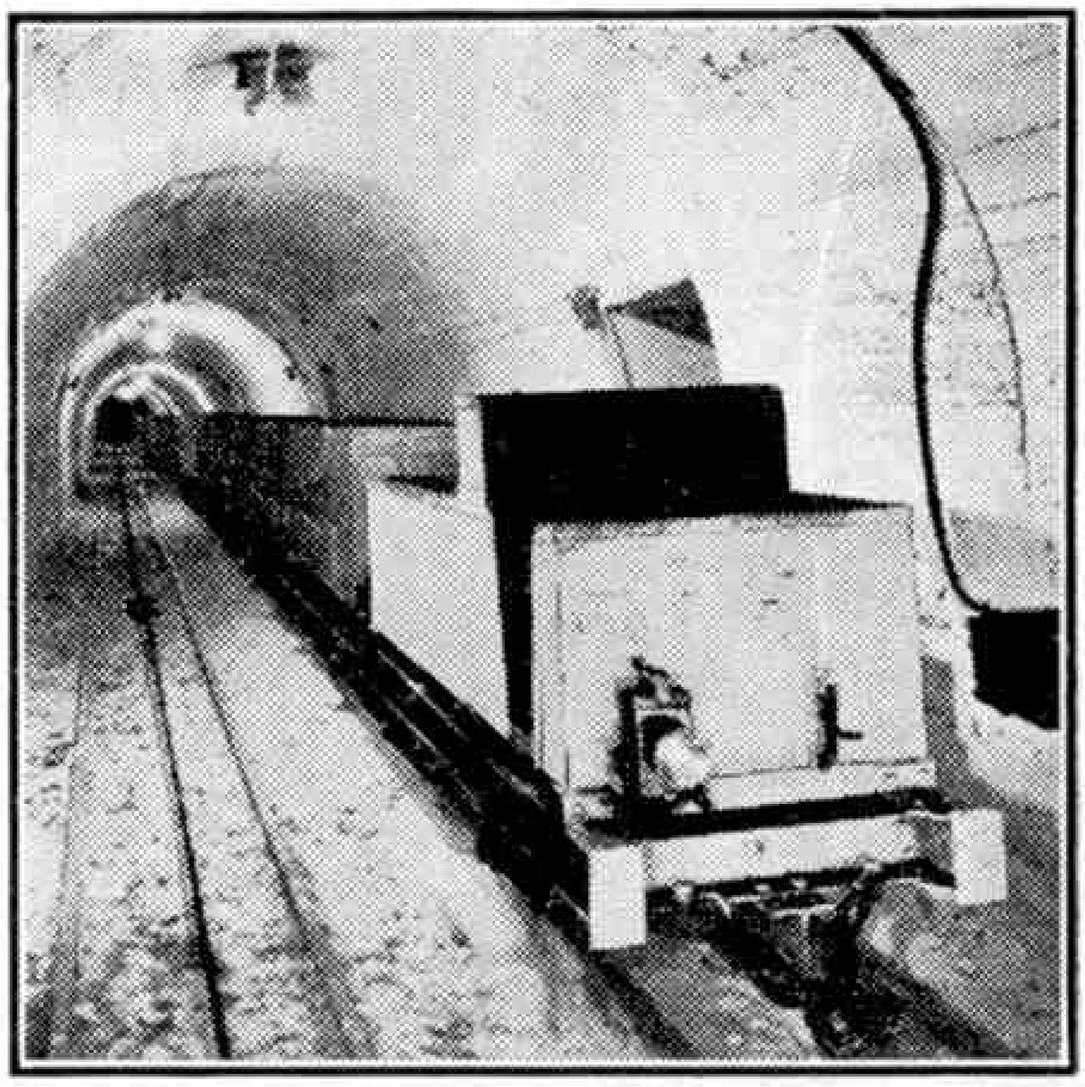
The upper illustration on this page shows a train that runs in a Midland coal mine, far below ground level. It is employed for carrying miners from the pit bottom to the coal face, and its use saves the men a long and arduous walk through low unlit roadways. The train is rope-hauled, and the rope itself is driven electrically.

The road used is 2,300 yds., or about 1¼ miles in length, with a total fall towards the working district of 456 ft. The roadway has been improved and straightened, and firm and smooth walls and roofs are assured by the use of steel arch girders and reinforced concrete, the effects of which can be seen in our illustration. The electric lighting shown in the illustration is available only at the termini.

Two trains are used, working in balance so that one ascends as the other descends. Each consists of 17 trams of special construction, having tall sides, low seats and side entry opening. A complete train is 190 ft. long, and is capable of carrying 136 men. There is a special brake tram at each end, and the man in charge travels in whichever of these is in front, where he has control over the emergency brakes. The brake blocks are of special design and are arranged so that when applied they bear on the track and wedge the wheels at the same time. All the tram brakes are connected together by rods extending to operating gear in the two brake trams. Suitable front and rear lights are provided, and these are interchanged at the end of each journey by the man in charge of the track.

Owing to undulations the trains require hauling over some parts of both journeys, so the haulage rope has to be endless. The haulage must be started very steadily so as to give time for the tail sheave to take up the rope stretch. The diameter of the rope is 1" and each train is lashed to it at both ends. Its average speed is 8 m.p.h.

The mechanical parts of the haulage engine, were made by Messrs. Walker Bros. and the electrical equipment by the British Thomson-Houston Co. Ltd. The main sheave runs at 32 r.p.m. and is coupled to the motor through double reduction gearing. The drive is supplied by a three-phase, 3300 v. 50 cycle induction motor having a one-hour rating of 125 h.p., 730 r.p.m. The motor and other electrical equipment are all flameproof.



A mine haulage train recently put into service in a Midland colliery. It carries miners on long journeys underground to and from the coal face. Photograph by courtesy of the British Thomson-Houston Co. Ltd.

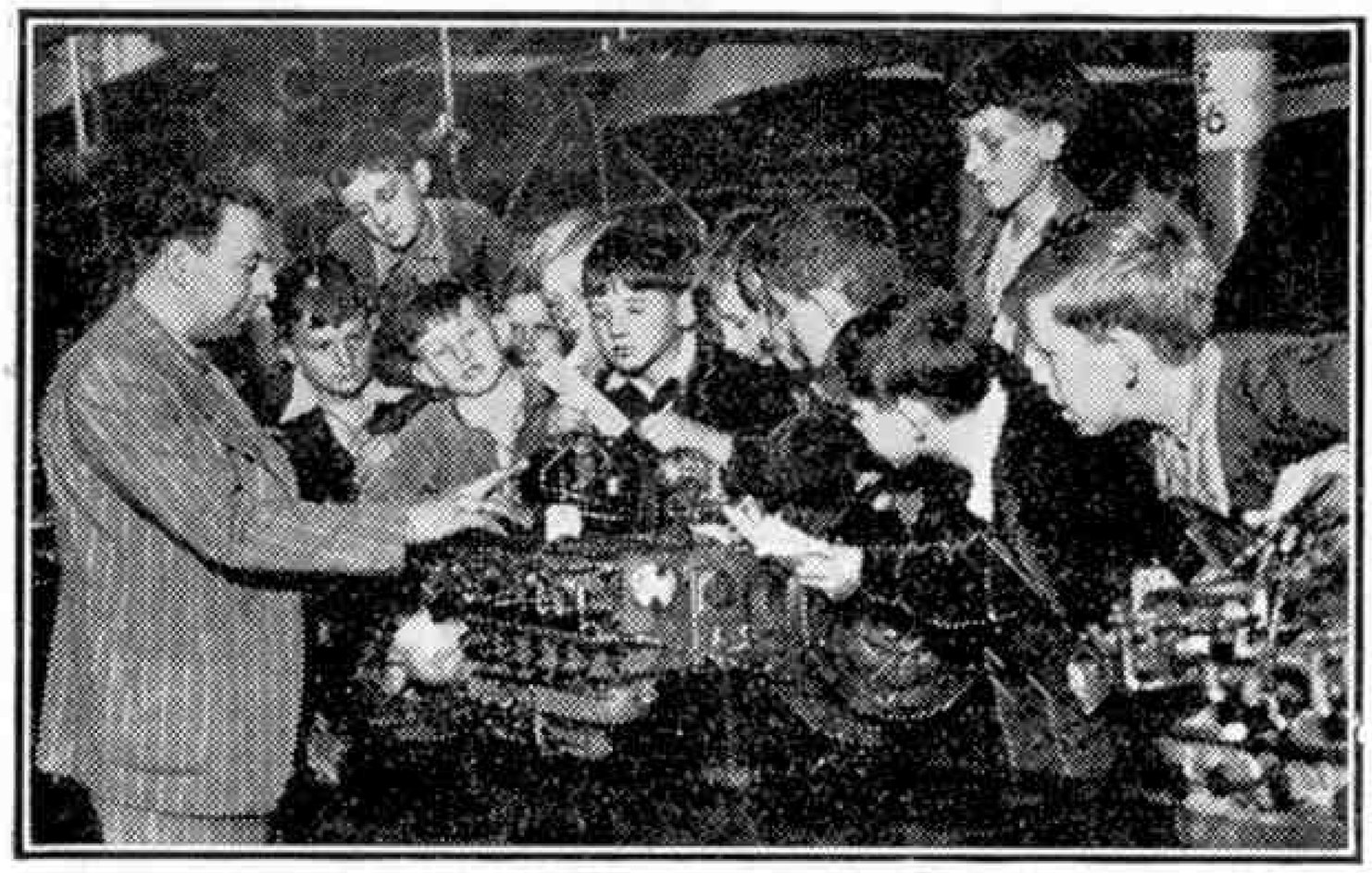
Although the brakes can be applied by pedal, a screwdown, or by the fall of a weight that normally is supported electrically, it is not necessary for the operator to use the pedal except to ease the brake off steadily when starting up. The electrical control comes into operation automatically, and the main brake is applied, whenever the controller handle is brought to the "off" position, and this also would happen if the main circuit breaker were to open through failure of the supply, overload on the motor, excessive speed, or over travel.

World's Largest Transformer

What is claimed to be probably the largest electric transformer yet made has been completed by the A.S.E.A. Co., a Swedish firm, for the Swedish Government. It is being installed in a set of transformers used in the transmission of current from hydro-electric stations in the north of Sweden to the south.

The transformer weighs 219 tons, and 298 tons when filled with oil. It is a 120,000 kVA unit built in three rounded sections, and heat generated in it is dissipated by means of gilled tubes set round it. In warm weather forced cooling is provided by eight propeller fans. Half of these are switched on automatically when the windings of the transformer reach a temperature of 158 deg. F., and the rest at 176 deg. F.

An interesting feature of the use of such a large transformer is the saving in material that it effects. The substitution of two transformers, each of half its capacity, would have meant the use of an additional 17 tons of copper, 86 tons of oil, and 109 tons of iron and other materials. The electrical losses also are less than if two transformers had been used.



Engineers of the future. Boys keenly interested in the details of a tractor engine during a tour of the works of David Brown Tractors Ltd., Meltham, to whom we are indebted for our illustration.

Photography

In Brilliant Sunshine

PICTURES taken on a dull day are almost always flat and uninteresting. They have no contrasts of light and shade, but instead have an all-over-alike appearance. Sunshine is necessary to give life and sparkle to a scene, but this does not mean that every picture taken on a sunny day will be successful merely on that account.

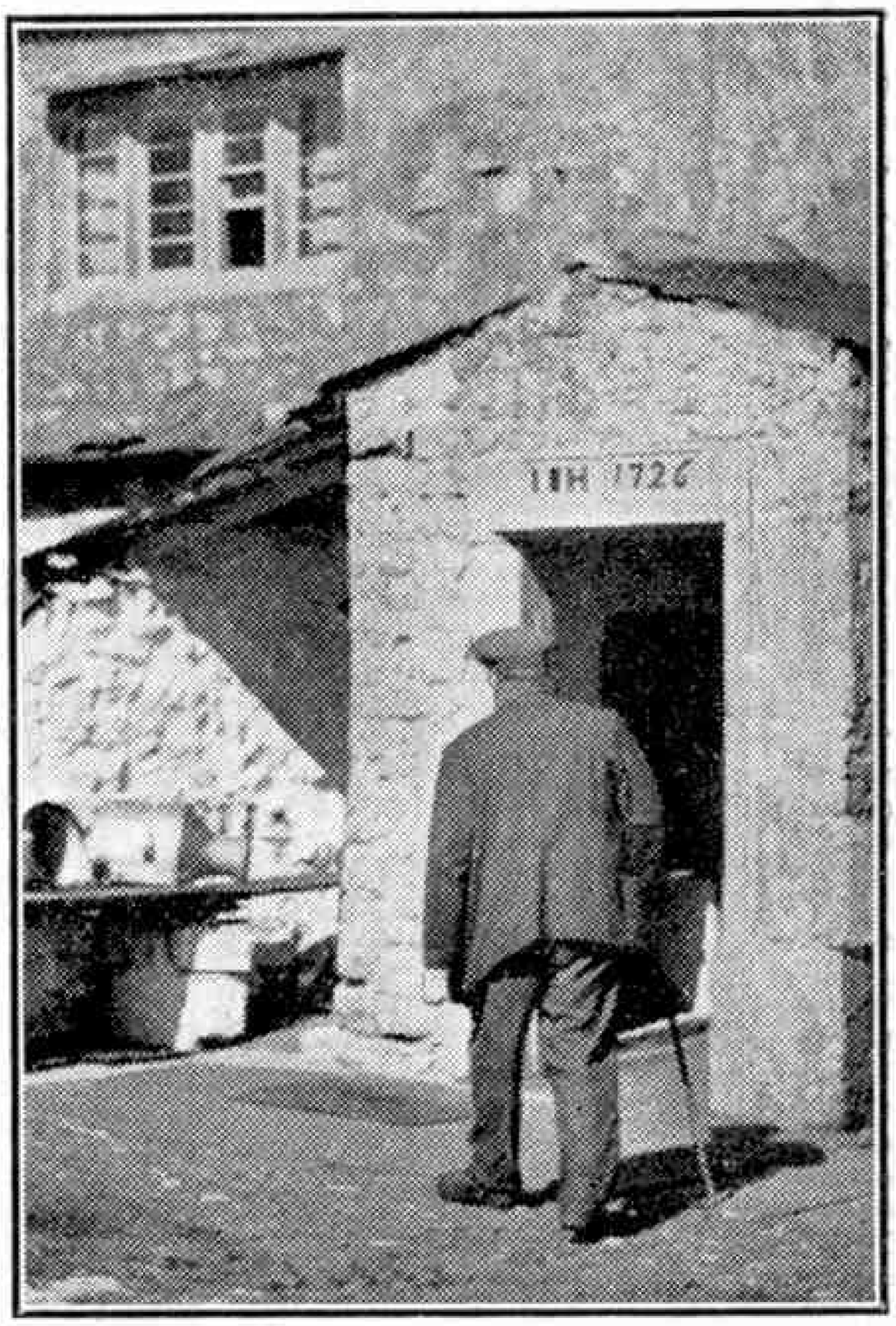
Pictures taken with the sun immediately behind the camera are usually disappointing for they tend to have little life. The trouble appears to be that the details are all equally clear and so there are no points of interest. Generally speaking the best position for the sun is well to one side, for this gives good contrast and variations in light and shade. In the old days, when photography was surrounded by strict rules, beginners were told that they must always take their photographs with the sun in this position. Nowadays, when we have shed the majority of the rules and turned photography into the most attractive of all hobbies, we often do things that would have aroused the wrath of the old-timers. For instance, we take pictures against the sun and very often get striking results! In this case it is absolutely necessary to shade the lens so that the sun does not shine directly upon it.

The strong shadows thrown by bright sunlight play an important part in the success of many photographs. Such shadows will make a picture of even the simplest country cottage look very attractive if taken in the middle of the morning or afternoon, not at mid-day when the sun is directly overhead.

Sometimes on a day of brilliant sunshine very peculiar shadows are thrown by isolated objects, and although these may not be strictly pictorial they are certainly attractive and should be looked for. Usually one comes across these shadows unexpectedly, and their source may be something that is quite uninteresting in itself, such as a broken-down gate or a twisted old relic of a tree. I remember some very fascinating pictures of shadows thrown by ornamental shrubs that had been cut into the shapes of birds and other creatures.

Reflections in still water provide a good opportunity for utilising sunshine. These reflections may be of trees on the margin of the pond or of a house or other building. A low bridge is another source of attractive reflections combined with shadows, and similar effects are often produced by boats at anchor or by a slowly drifting swan.

To get the best results from sunshine pictures the exposure must be fairly correct, and it is worth while to take a bit of trouble about this. Over-exposure within reasonable limits will not spoil the picture, but any serious under-exposure is fatal to success.

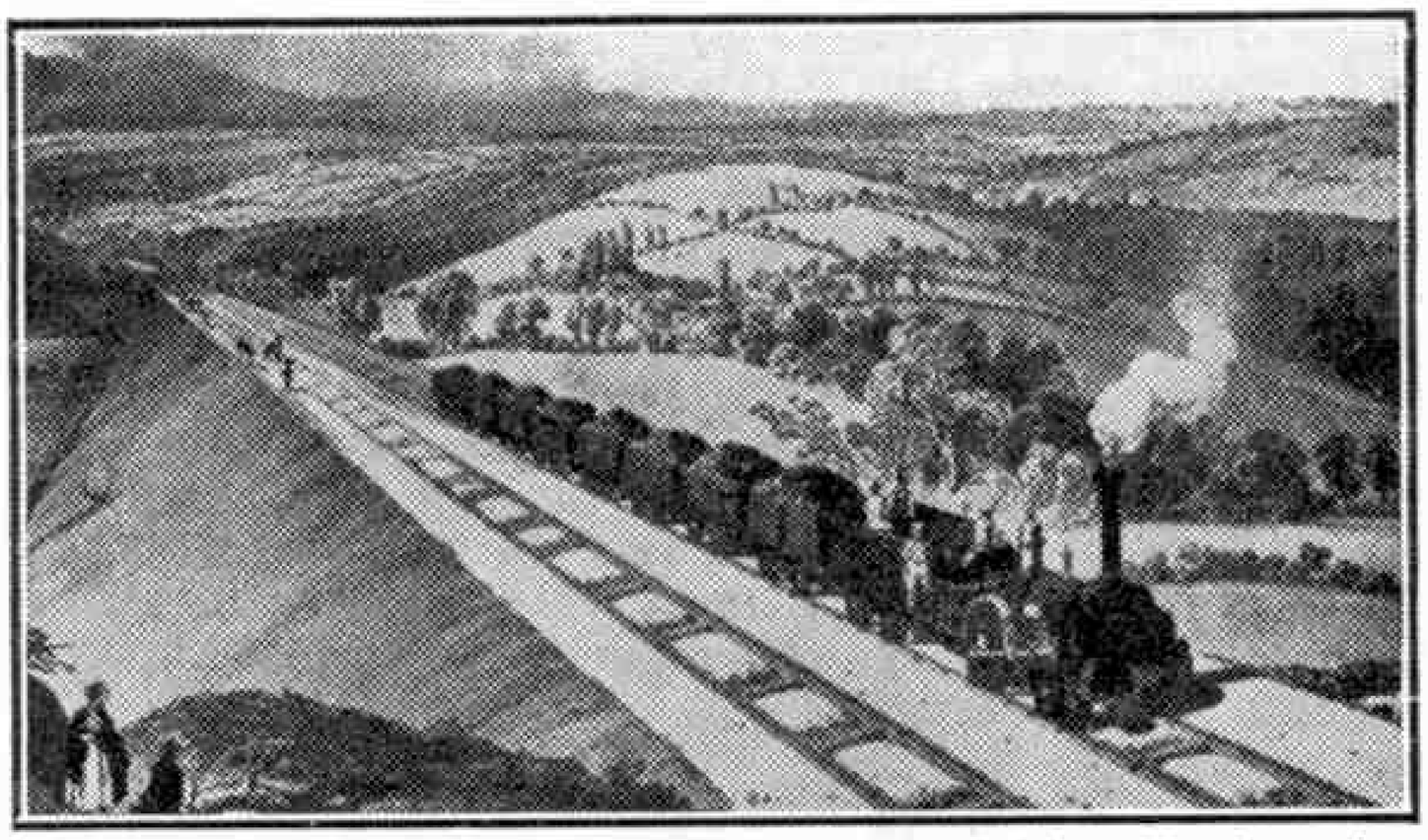


An Old Yorkshire Farmhouse. Photograph by J. Mitchell, Bradford. The upper photograph is by J. Boulton Myles, Wellington College, Berks.

Working the Lickey Incline

Two Miles of 1 in 37 on a Main Line

THERE is a remarkable fascination in the working of steep gradients, particularly where these are so severe that they make necessary special measures for the running of the trains either uphill or down. Steep slopes are not uncommon on subsidiary lines, but when an important main line boasts a couple of miles inclined at 1 in 37, then clearly the train working is bound to be interesting. This is certainly



A train of 1840 ascending the Lickey Incline, hauled by a Norris engine. Illustration by courtesy of the L.M.S.

the case with the Lickey Incline on the L.M.S. Birmingham and Bristol main line which, in spite of the severity of its gradient, has always been worked by locomotive power. Unlike certain other inclines it has never been operated by stationary winding engines, although it was considered impossible for locomotive operation by both Brunel and Stephenson.

Just how so steep an incline came to be included in a main line railway, and that at a time when the steam locomotive had hardly proved itself as a hill-climber, is rather interesting. The Birmingham and Bristol Railway was originally projected in 1825, but the scheme fell through. Then in 1832 came a revival of the project, but this time as the Birmingham and Gloucester Railway. Brunel was engaged on the original survey, when lack of funds necessitated such rigid economy that "No success, no pay" was the condition of engagement of the engineer! The line was to run by way of Bromsgrove, Droitwich, Worcester, Tewkesbury and Cheltenham, but local opposition caused a route to be chosen away from Cheltenham and by Spetchley to the east of Worcester, and Tewkesbury had to be subsequently reached by branch line from Ashchurch. This meant that the line reached the edge of the high ground separating the valley of the Trent from that of the Severn at a point where the fall to the latter is quite steep, although the degree of rise on the opposite side is very small.

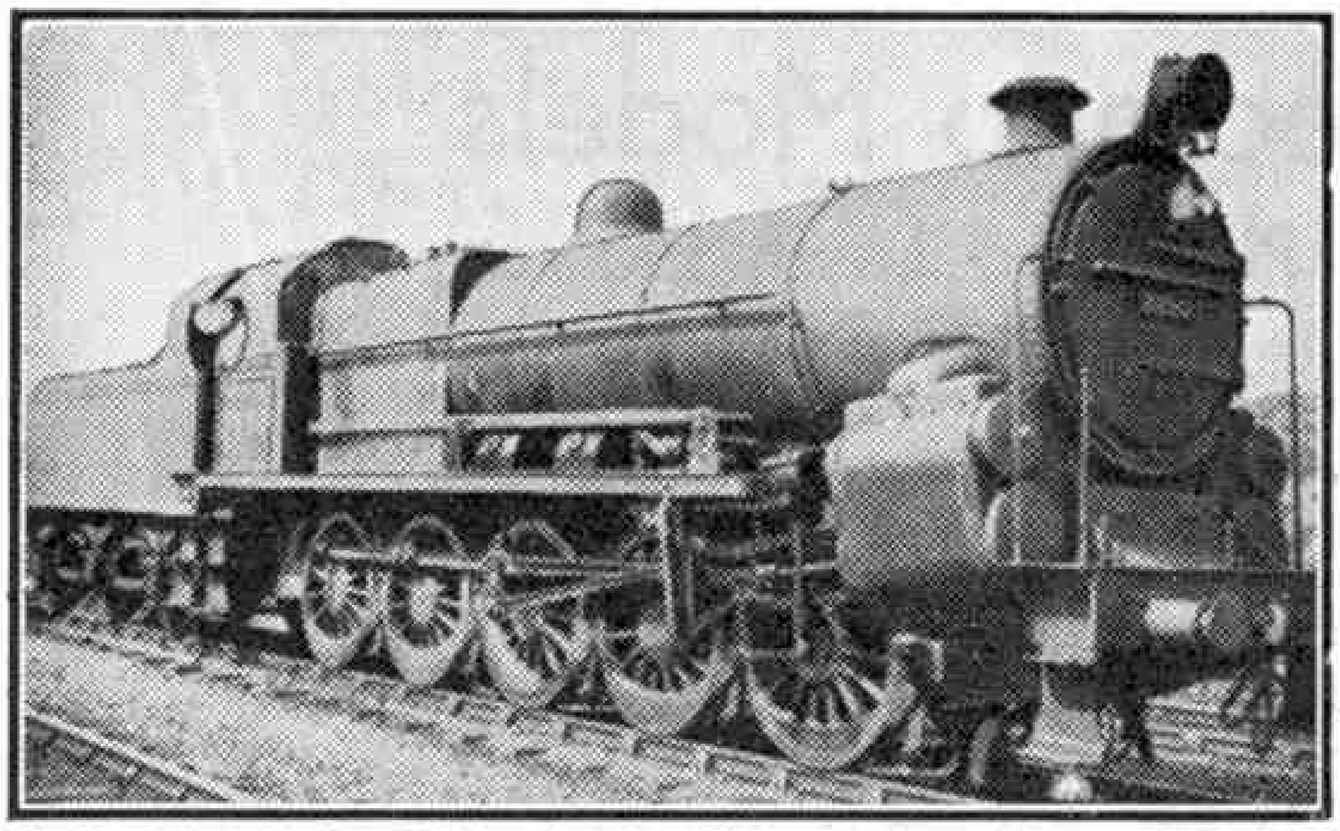
Then came a proposal to take the line still farther east and thus avoid such a steep incline; but this was objected to because Worcester already was left well out of things, and any further deviation eastward would make matters worse. The Lickey route was then agreed to and the Bill was passed by Parliament in 1836, the line being the only one to obtain its Act at the first time of submitting its Bill.

So the Lickey Incline came into being, and in spite of the objections of eminent engineers to the use of locomotives, ordinary adhesion working was adopted and has held good ever since. In its earliest days the engines employed on the incline were of American origin with 4 ft. diameter driving wheels, supplied by the firm of Norris of Philadelphia. These were ordered because British firms were then very busy and were unwilling to get out new designs for such special duties. So Captain Moorson, the engineer-in-chief of the railway, placed his order abroad, which resulted in the delivery of the first American-built engines to be put into service on a British railway.

The suitability of American engines was challenged by Edward Bury, well known as a locomotive builder, and at that time also Locomotive Superintendent of the London and Birmingham Railway. Bury sent one of his firm's engines with 5 ft diameter driving wheels to tackle the Lickey, he himself acting as driver. Passing through Bromsgrove, Mr. Charles Sturge who was on the footplate with Bury called to the representative of the American concern, a Mr. Gwyn, to join him on the footplate. Gwyn declined, saying that the Bury engine would soon return. It did, apparently being unable to negotiate the incline.

The Norris engines appear to us now to have been undersized little things for work on such a gradient. They had the rather curious 4–2–0 wheel arrangement, a swivelling bogie supporting the smoke-box, and the driving axle passing just in front of the fire-box. Although the upper illustration on this page shows a Norris engine apparently dealing with eight wagons, it has been stated that it was known for as many as

Using "pinbars" to set the brake levers of a freight train at Blackwell as the descent commences. This and the photographs reproduced on the next page are by B. E. Timmins, Birmingham.



A giant at rest; the "Lickey banker," No. 2290, waiting at Blackwell before returning down the gradient to Bromsgrove. Note the tender cab and the special electric headlight provided to assist the enginemen when drawing up behind a train at night.

seven Norris engines to be used on one train. British engineers criticised the finish of the Norris productions as being rough, and in the writings of David Joy, of valve gear fame, we read that they included "plenty of cast iron; even the crosshead pins were cast iron." He admitted however that "the little thing could pull," when trying out one of them on one occasion.

The boiler of one of the Norris engines burst in November 1840, killing the two enginemen, Thomas Scaife and John Rutherford. They were buried in Bromsgrove churchyard, and on each tombstone was carved a representation of the American type engine, correct in detail.

The following month saw the opening of the entire line from Gloucester to Camp Hill, Birmingham; the first section, from Bromsgrove to Cheltenham, having been opened the previous June. By August 1841 a junction with the London and Birmingham Railway had been completed and trains were running. This early union of interests in the Birmingham district led to the strong position held by the former Midland and London and North Western Railways, and so to the extensive L.M.S. interests in the area to-day.

Whatever the shortcomings of the American Norris engines, very similar locomotives were built for Lickey Incline service by various English firms. These apparently were more satisfactory, but even so some of the American and some of the English ones, rebuilt as saddle tanks, were working as late as 1860.

The progress in motive power during the past century of the Lickey Incline's existence is extremely interesting. The puny Norris engines soon had to be supplemented by something more powerful, and in 1845 there was built a six-coupled tank engine named "*Great Britain*" for working the incline. In later Midland days the first choice for banking duties on the Lickey were the six-coupled tanks of the Johnson period, and from the latest of these were developed the standard L.M.S. 0–6–0 tanks that still share the banking duties. These engines of course are small compared with the special 0–10–0 tender engine that appeared in 1920 from the Midland shops at Derby. This four-cylinder monster, No. 2290, is the only ten-coupled engine in existence on British railways. As it spends half its running time travelling backward down the incline, it is fitted with a cab on the front end of the tender.

Operations on the "home pitch" of this hard-working engine are well described in the following paragraphs, which are based on notes received from one of our readers, B. E. Timmins, of Birmingham. Let him tell us his story in his own words.

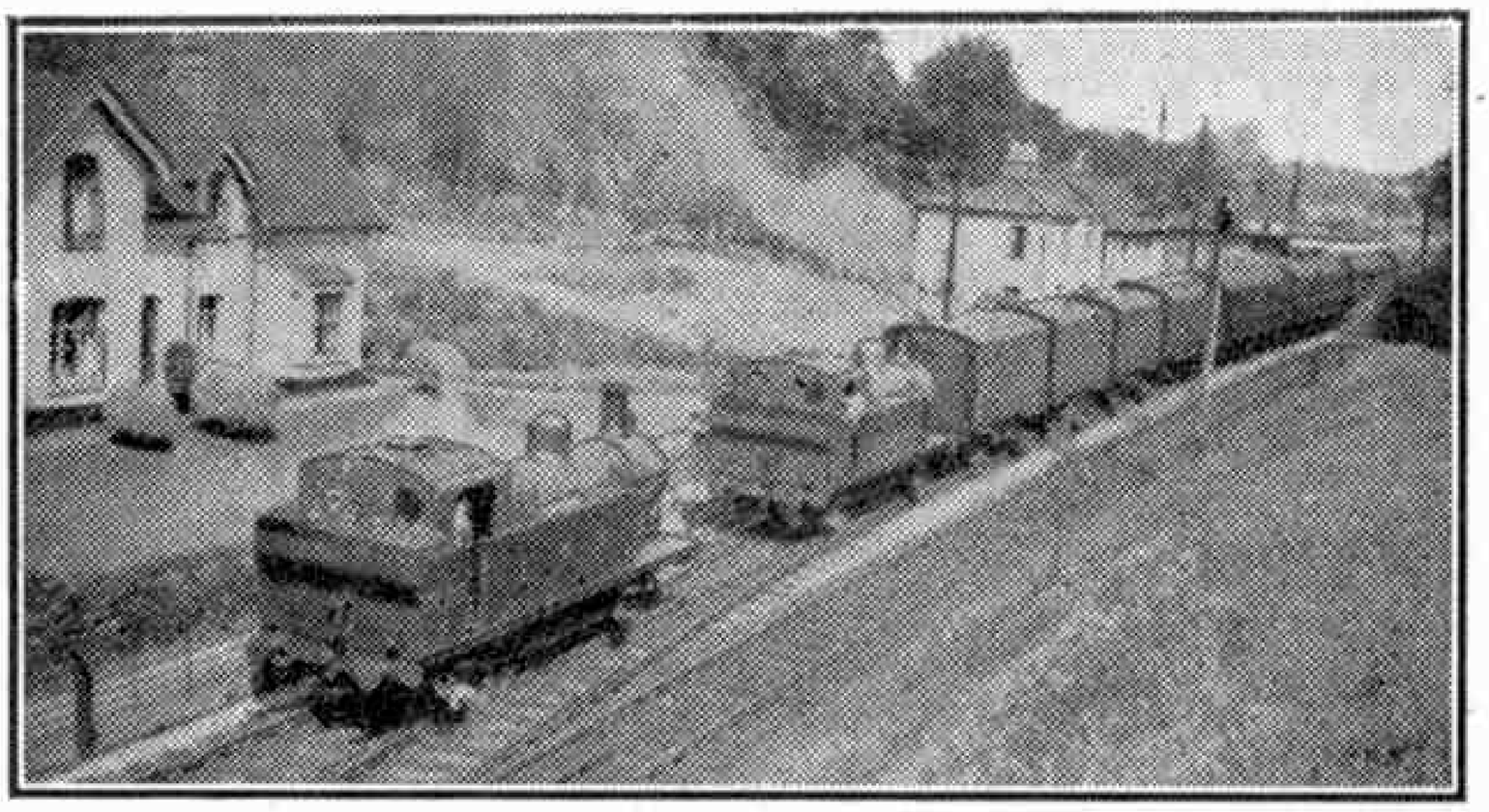
"As the steepness of Lickey Incline has always meant special measures for assisting trains 'up the hill,' so the first thing one notices on arrival at Blackwell station at the head of the incline is the precautions taken against runaways.

"Freight trains are halted to obey a notice at the summit that enjoins '*Goods trains to stop to pin down brakes.*' The Brakesman and Guard start at the brake van and work along the train dropping all the brake levers; the train is then allowed to proceed slowly on to the incline. As it passes, these men pin down a prearranged number of brakes, necessary to control the train. They carry shaped pieces of wood known as brakesticks, which they insert between the wagon springs and brake lever. They then press the brake lever down and slip the pin in the rack. The guard's brake is held in reserve for emergencies.

"When watching ascending operations at Blackwell, interest quickens when, half-way down the bank, a 'distant' is pulled off; then 100 yds. from the summit the double arm signal rises, and next the "home" at the station. All are upper-quadrant signals. At the bottom of the grade appears a cloud of smoke and steam shooting high into the air, followed by the banker at the rear also flinging up a terrific blast. Slowly the mechanical cavalcade toils its way up the bank.

"As the train approaches you notice it is double-headed by a Class 2 Rebuild and a '5P5F.' As they slowly pant by you catch their numbers, 505 and 5441, the sharp roar of the characteristic Midland exhaust of the 'high-wheeled' No. 505 mingling with the staccato bark of the smaller-wheeled Stanier. The long train clicks slowly over the catch points, and counting the coaches as they pass you find that the train is made up of 16 vehicles. As the two engines breast the summit the clatter of the wheels over the catch points quickens, and in full cry the 'owner' of this bit of line clanks by, its 4 ft. 9 in. wheels pounding round, powerful exhaust rearing high. It is of course No. 2290, the unique 0–10–0 for which this gradient is famous.

"If the banking engine has to wait at the top for any length of time the next (*Continued on page 302*)



Banking engines dropping off the rear of a train at the summit. Blackwell station is in the background and at the home signal on the right the engines of descending freight trains stop to allow the wagon brakes to be applied.

New Meccano Models

Ash Disposal Plant and Lawn Mower

FIG. 1 shows a model of an ash disposal tower designed for loading ash from locomotives into a railway wagon, which is then tipped at the ash dump. When the plant is in use the locomotive is run over a truck standing in a pit sunk between the running rails. The ashes are then released into the truck, which is hauled up the tower and tipped down a chute into a railway wagon. The latter is then hauled away to the ash dump.

The model is operated by an E06 or E020 Electric Motor, and its construction is commenced with the operating platform and the supports on which it is mounted. The platform consists of two 9½" Angle Girders, bolted at each end to 2½" Angle Girders and 2½" × 2½" Flexible Plates. The front and back of the control cabin are formed from two 4½" × 2½" Flat Plates overlapped and bolted together with 4½" Strips to the 9½" Angle Girders in the position shown, and attached at each side to 3½" × 2½" Flanged Plates, to the upper edges of which 2½" Curved Strips are bolted.

The platform supports consist of 9½" and 12½" Strips, which are bolted to it and braced by 3½" and 5½" Strips. The 9½" and 12½" Strips are bolted at their lower ends to vertical 5½" Angle Girders 1, to which 5½" × 2½" Flexible Plates and 5½" and 2½" Strips are attached. The Angle Girders on the right are spaced apart by a 5½" × 3½" Flat Plate, while those at the left are bolted at their upper ends to a 3½" × 2½" Flexible Plate. The pit is fixed to the latter Girders, and consists of a 4½" × 2½" Flat Plate that is attached at its front and rear ends by 1" × 1" Angle Brackets to 2½" × 2½" Flat Plates, which are extended half an inch by 3" Flat Girders bolted to them. A 4½" Angle Girder is bolted to the upper edge of the 4½" × 2½" Flat Plate and is attached to a 5½" Angle Girder forming one rail of the track upon which the locomotive runs. A 2½" × 1½" Flexible Plate is also bolted to each end of the 4½" Angle Girder and to a 3" Angle Girder fixed to each of the Plates at the front and rear, a gap of 1½" being left between them through which the ash falls. The other rail is a 5½" Strip 2 attached to the Flexible Plates and also to the Flat Girders.

The pit is fixed in place by 1" × 1" Angle Brackets, to which 3" Strips are attached, and is completed by fitting a 4½" Flat Girder to the inner rail of the track and connecting it by a 3½" Angle Girder to the support.

The truck is hauled along rails consisting of two 5½" Curved Strips attached by ½" × ½" Angle Brackets to the 4½" × 2½" Flat Plate of the pit. The Curved Strips are also bolted to 5½" Strips 3, which are secured at the correct gauge on a 3" Screwed Rod held in the Flexible Plates of the support. The 5½" Strips are extended at their upper ends by 2½" Strips 4 that are attached by ½" Reversed Angle Brackets to the 5½" Strips bracing the legs.

The chute for guiding the ash into the wagon is formed from two 1½" Flat Girders, edged by 1½" Strips and attached to the 2½" Strips 4 by ½" × ½" Angle Brackets and Corner Angle Brackets.

The wagon is constructed from a 2½" × 1½" Flexible Plate, which is bent up at each end and bolted to 2" Strips and 1½" Flat Girders, braced by two 1½" × ½" Double Angle Strips. The wheels are ½" loose Pulleys, and are free to pivot on ½" Bolts fixed to Double Brackets attached by means of a 2" Strip to the wagon. Three Washers are placed on the shank of each Bolt for spacing purposes. The rear end of the wagon is a 1½" Flat Girder fixed in place by a ½" × ½" Angle Bracket. Two Pawls without bosses 5 are bolted to the Strips 4 as shown, but spaced from them by two Washers so that they engage the boltheads of the front ½" Bolts on the wagon.

A counterweight 6 for the wagon is formed from a 2½" × 1½" Flanged Plate, to which are attached two 2½" Angle Girders and a 25-gramme Weight. The Flanged Plate slides on two 8" Rods fixed at their lower ends in Rod and Strip Connectors and held at their upper ends in a 2½" × ½" Double Angle Strip bolted underneath the platform.

An E06 or E020 type Electric Motor is mounted on the platform, but is spaced from it by several

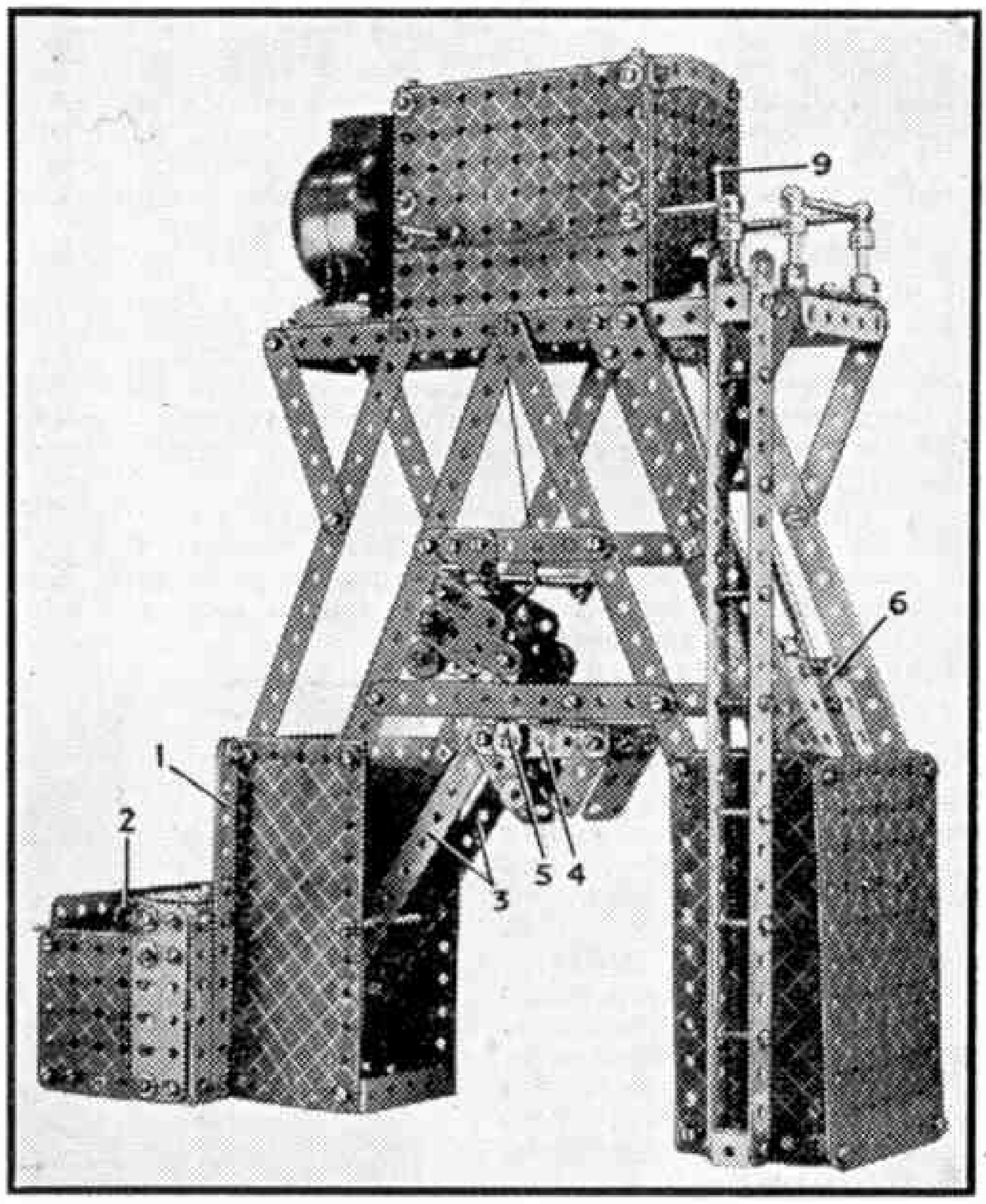


Fig. 1. A fine working model of a locomotive ash disposal plant. It is electrically operated.

1½" Strips so that its armature shaft passes through a hole in the Plate at the side of the cabin. A ¾" Contrate 7, Fig. 2, is fitted on the end of this shaft and forms one member of the reversing gear, the other member of which is a ½" × ½" Pinion 8. The Pinion is mounted on a 3½" Rod that is free to slide in its bearings and is controlled by a lever 9, Fig. 1, formed from a 1½" Bolt fixed in a Collar held on the end of a 5" Rod. This Rod also carries a Collar, in the tapped bore of which is inserted a ¾" Bolt engaging between two Collars on the Rod. The Pinion 8 remains in constant mesh with a second ½" × ½" Pinion fixed to a 3" Rod, which transmits the drive to a 57-teeth Gear on a further 3" Rod. A Worm also mounted on this Rod meshes with a ½" Pinion 10 on a 5" Rod forming the winding drum.

The Cords for hoisting the truck and the counterweight are fastened to Cord Anchoring Springs

mounted on the Rod and arranged so that one Cord unwinds so the other winds inward. The Cord for hoisting the truck is guided around a 3½" Rod mounted as shown in Fig. 1, and is fastened to the rear end of the truck. The Cord operating the counterweight is passed round a 3" Rod journalled in 1" Triangular Plates bolted to the platform, and also through a Handrail Support, which is bolted to the counterweight before it is fixed to the platform. The model is completed by attaching the ladder and fitting handrails to the platform.

Parts required to build model Ash Disposal Plant: 6 of No. 1; 4 of No. 1b; 9 of No. 2; 2 of No. 2a; 6 of No. 3; 2 of No. 4; 6 of No. 5; 3 of No. 6; 20 of No. 6a; 2 of No. 8a; 5 of No. 9; 1 of No. 9a; 1 of No. 9b; 2 of No. 9c; 4 of No. 9d.; 6 of No. 11; 17 of No. 12; 6 of No. 12a; 2 of No. 13a; 2 of No. 15; 2 of No. 16; 1 of No. 16a; 3 of No. 16b; 1 of No. 18a; 3 of No. 18b; 4 of No. 23; 1 of No. 26; 2 of No. 26a; 1 of No. 27a; 1 of No. 29; 1 of No. 32; 4 of No. 35; 210 of No. 37a; 167 of No. 37b; 67 of No. 38; 1 of No. 40; 2 of No. 48; 4 of No. 48a; 1 of No. 51; 1 of No. 52a; 2 of No. 53; 5 of No. 53a; 12 of No. 59; 1 of No. 62b; 1 of No. 67; 2 of No. 72; 2 of No. 77; 1 of No. 80c; 1 of No. 81; 2 of No. 89; 2 of No. 90; 1 of No. 103c; 2 of No. 103e; 5 of No. 103h; 8 of No. 111; 8 of No. 111a; 6 of No. 111c; 1 of No. 111d; 2 of No. 125; 2 of No. 128; 2 of No. 133a; 1 of No. 136; 3 of No. 136a; 2 of No. 147c; 1 of No. 154a; 1 of No. 154b; 2 of No. 176; 3 of No. 188; 2 of No. 190; 1 of No. 190a; 1 of No. 191; 4 of No. 192; 2 of No. 212; 1 E06 or E020 Electric Motor.

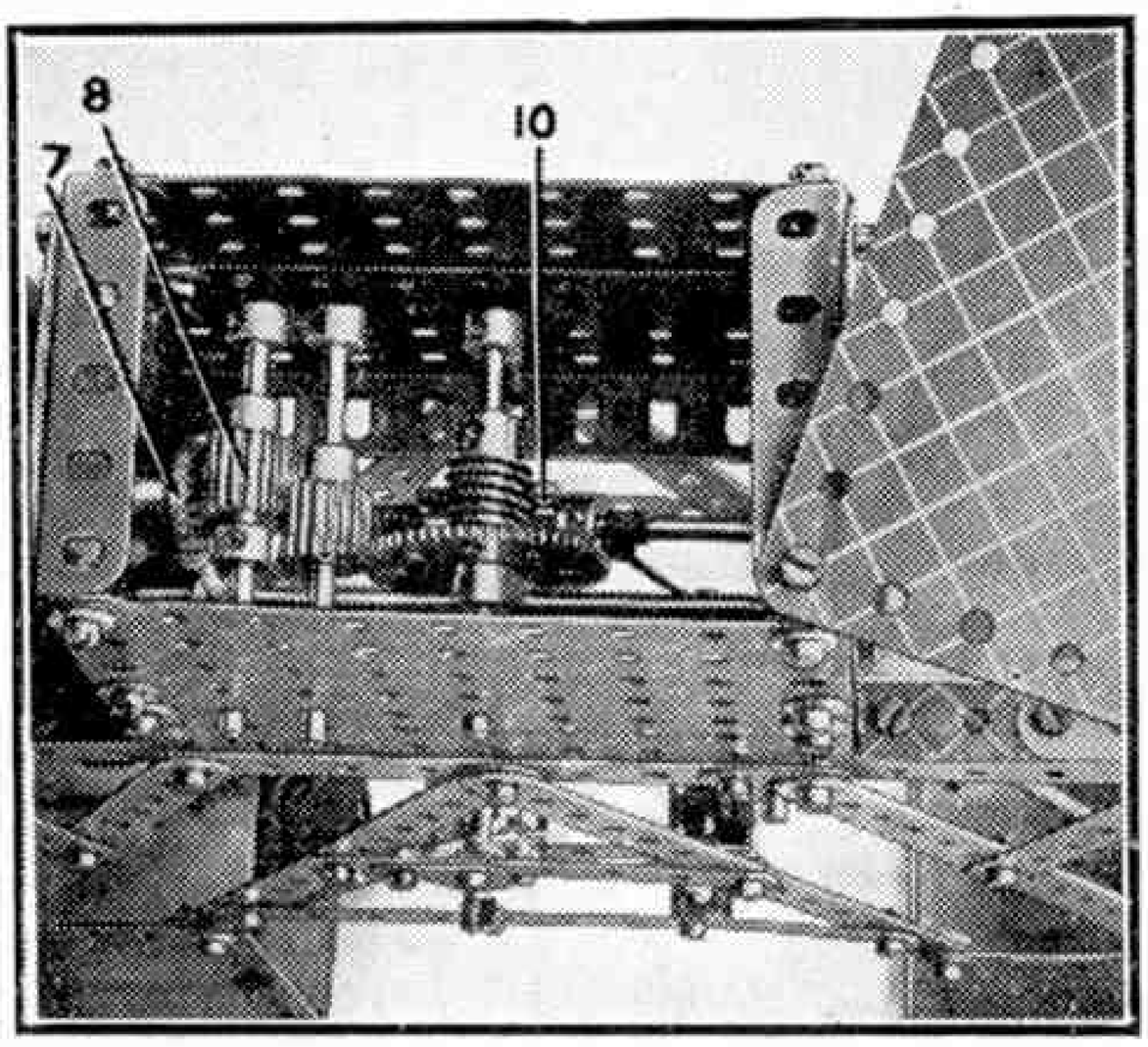


Fig. 2. Close-up view of mechanism on platform of ash disposal plant model.

LAWN MOWER

Gardening implements are familiar subjects with model-builders and among these the various types of lawn mowers are specially attractive. The lower illustration on this page shows a model of a simple type of lawn mower in which the blades are actually mounted on the axle of the travelling wheels.

The model is commenced with the construction of the framework. Each side of this consists of three 3½" Strips bolted to 2" Angle Girders at their front ends, the remaining space between the lower two Strips and the upper one being filled in by a 2" Strip. The rear ends of the 3½" Strips are bolted to a Flat Bracket that is attached to Angle Brackets. The sides are spaced apart by a 4½" Strip braced by 1" Corner Brackets at the front and a 4½" Flat Girder at the rear end.

The travelling wheels are now assembled. Each is formed from two Wheel Flanges that are bolted to 1¼" Discs. The inner Wheel Flanges carry the free-wheel mechanism, consisting of an Obtuse Angle Bracket pivoted to them by an Angle Bracket, as shown in the illustration. The Obtuse Angle Bracket 1 is held in engagement with the teeth of a Ratchet Wheel mounted on the axle 2, which is 6½" long, by a length of Spring Cord attached to one of two ¾" Bolts that secure the outer Wheel Flange to the inner one. The Rod 2 is journalled in the framework of the model and carries two 2" Pulleys 3, to which the blades, consisting of 3½" Strips 4 that are twisted slightly, are attached by means of Angle Brackets. A length of Cord is passed around each of the Pulleys 3 and is secured to the frame of the model to prevent the blades rotating on the backward movement of the mower. The fixed cutting edge is a 3½" × 2½" Flexible Plate 5 that is secured to the frame by a 4½" × ½" Double Angle Strip and which is also bent round to form the backplate for directing the cut grass into the container at the front of the machine. A roller consisting of two Sleeve Pieces that are fixed on a 3½" Screwed Rod between ¾" Discs is journalled in Flat Brackets, which are bolted by their elongated holes to a 3½" × ½" Double Angle Strip attached to the Flat Girder of the rear of the model. The position of the roller may then be varied, thus altering the height to which the grass is cut.

The handle is formed of two 3½" Angle Girders attached by means of ½" × ½" Angle Brackets to two 9½" Angle Girders that are bolted at their lower ends to 2½" Curved Strips. These Curved Strips are attached at their outer ends to Double Brackets lock-nutted to 1" Corner Brackets that are attached to each side. The detachable container is constructed as shown and is fitted to the mower by two Threaded Pins inserted in Handrail Couplings.

Parts required to build model Lawn Mower: 1 of No. 2a; 10 of No. 3; 4 of No. 6; 2 of No. 8a; 2 of No. 9b; 2 of No. 9e; 4 of No. 10; 6 of No. 11; 18 of No. 12; 2 of No. 12c; 1 of No. 14; 2 of No. 20a; 112 of No. 37a; 90 of No. 37b; 27 of No. 38; 1 of No. 40; 4 of No. 48b; 1 of No. 48c; 1 of No. 58; 1 of No. 80a; 4 of No. 90; 1 of No. 103c; 4 of No. 111; 2 of No. 111c; 2 of No. 115; 4 of No. 133a; 2 of No. 136; 4 of No. 137; 2 of No. 148; 2 of No. 163; 3 of No. 190a; 2 of No. 214; 4 of No. 217a; 3 of No. 217b.

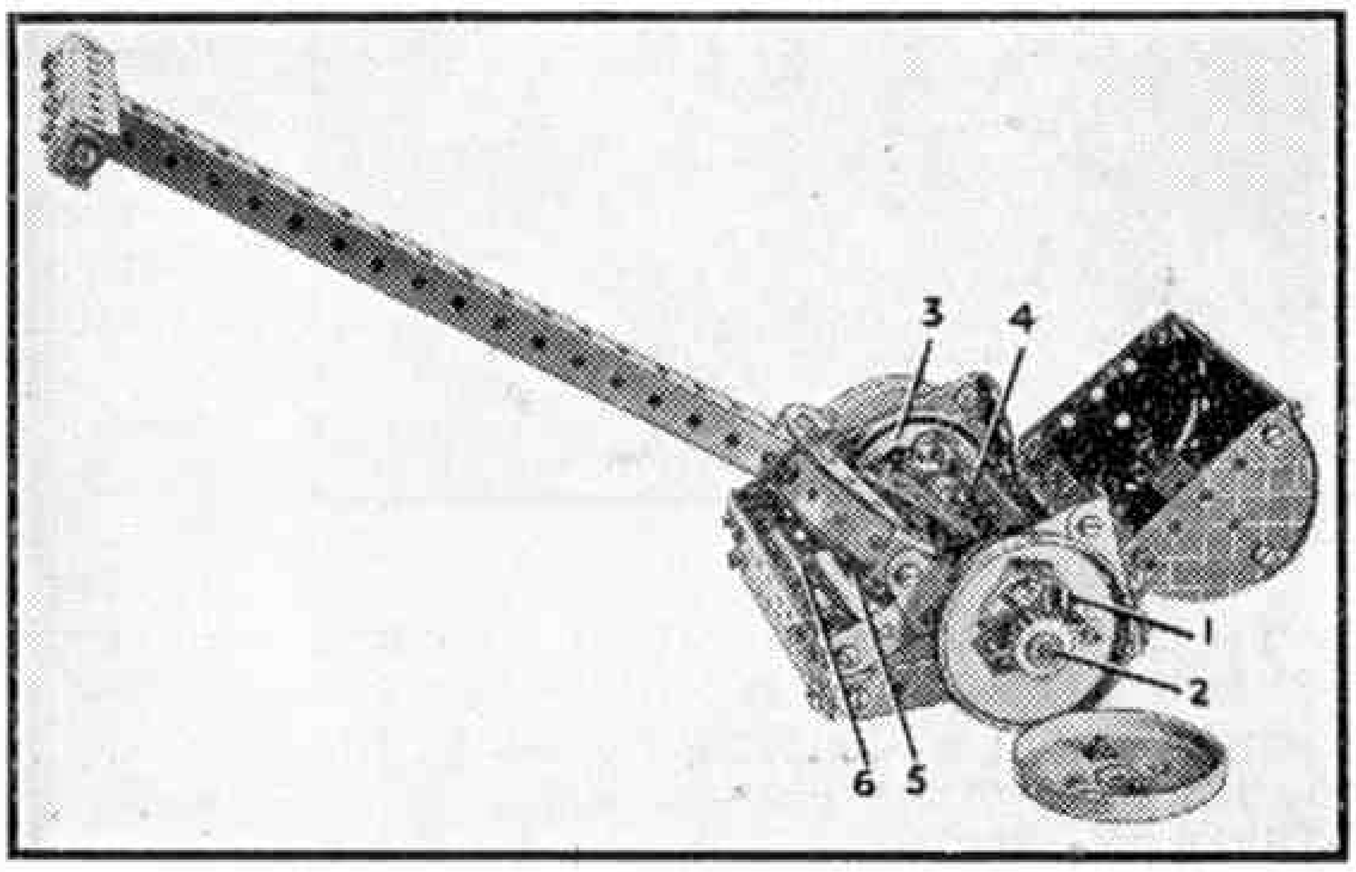


Fig. 3. A simple but effective working model of a lawn mower.

Suggestions Section

By "Spanner"

(558) Three-Way Tipping Mechanism

Fig. 558 shows a novel tipping mechanism designed to tip the body of a model lorry in three directions. It consists of a ram formed from two 2½" Curved Strips 1 universally secured at their lower ends to the chassis of the model by means of a "spider," which is lock-nutted to them and to a girder of the chassis. At its upper end the ram is lock-nutted to a Handrail Coupling that is free to slide and also to pivot on a 2½" Rod 2 held in Handrail Supports fixed to the underside of the body.

The Curved Strips are braced by ½" Bolts and are pivotally connected to a Collar, to which is fixed a Flexible Coupling 3. This Flexible Coupling is secured at its forward end in a Threaded Coupling 4, to which a 3" Screwed Rod 5 also is fitted. The Screwed Rod is journalled in a Double Bracket and an Angle Bracket bolted to the chassis; it carries a Threaded Boss that is secured by means of a Socket Coupling to a ¾" Pinion 6, which is driven from a suitable gear in the gear-box of the lorry. The body is attached to the chassis by means of four pins 7, one at each corner, each formed of a Threaded Pin secured in a Collar lock-nutted to a Hinge bolted to the underside of the body. Each Threaded Pin is fixed to the girders of the chassis by turning a wing nut 8, that consists of a Collar which

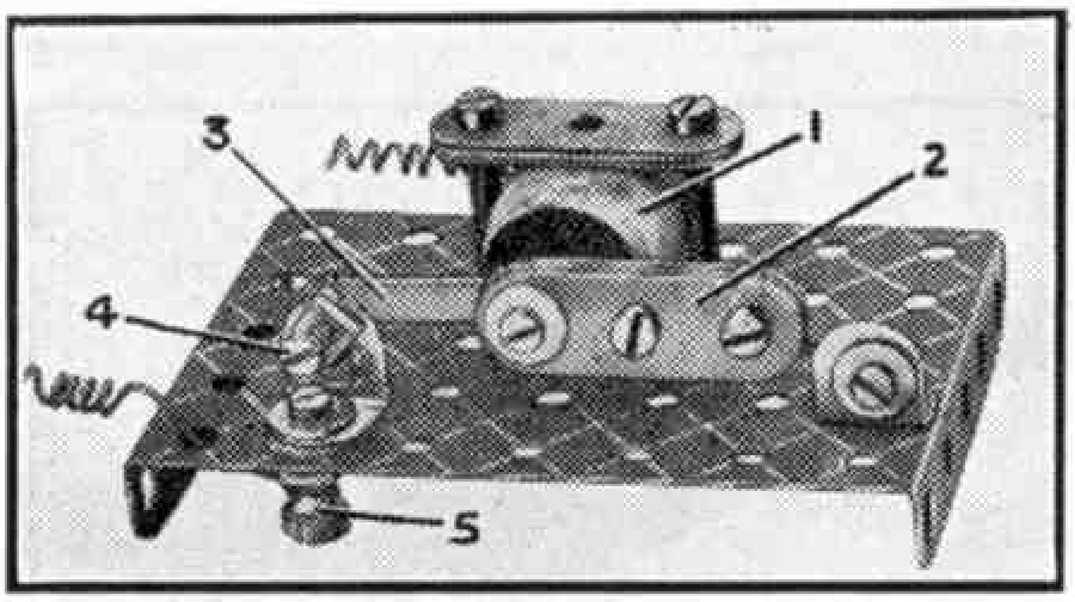


Fig. 559.

carries two Bolts and in which is secured a ½" Bolt. The ½" Bolt is screwed into the tapped bore of a Coupling bolted to the side members of the chassis.

When the Pinion 6 is driven from the engine and the two forward pins are unlocked, the lorry tips backwards. The lorry is tipped to the right or left on releasing the pins on the opposite sides.

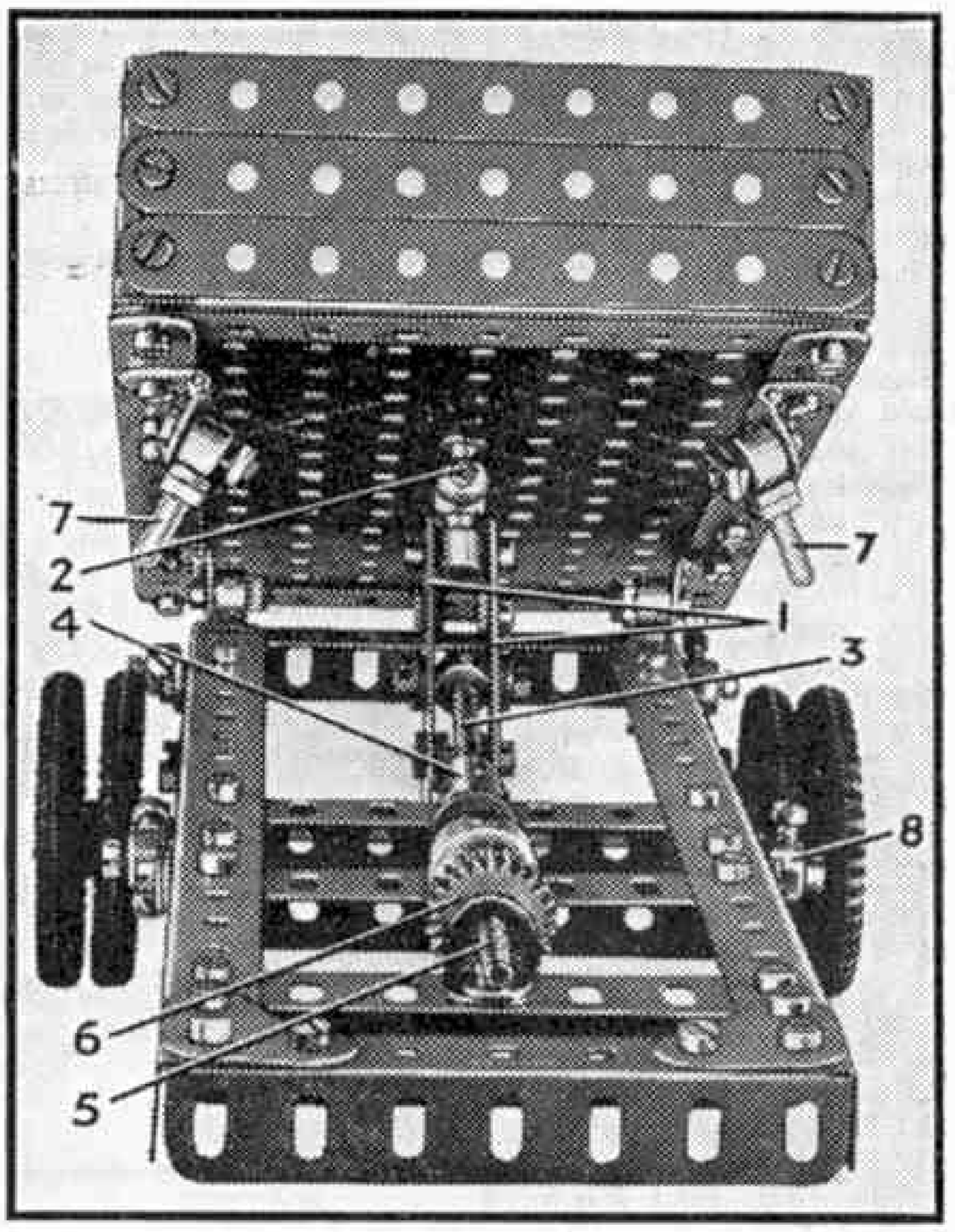


Fig. 558.

(559) A Simple Buzzer

A simple buzzer that gives a distinctly audible note when adjusted correctly is illustrated in Fig. 559. It consists mainly of a solenoid 1, formed from a Bobbin wound fully with 26 S.W.G. wire and fixed to a 3½" × 2½" Flanged Plate by 1½" Strips and 1⅛" Bolts. The core is a further 1⅛" Bolt held in place by a nut.

Four 1½" Strips 2 are bolted together to form the armature, and a Pendulum Connection gripped between these is bolted to a ½" × ½" Angle Bracket fixed to the base. The Pendulum Connection is bent so that the armature is normally held slightly away from the core of the solenoid. A portion of a second Pendulum Connection 3 is bolted to the other end of the armature, and normally makes contact with a ½" 6 B.A. Bolt 4 forming the contact screw. This is held in a ½" × ½" Angle Bracket by two 6 B.A. Nuts. The Angle Bracket is insulated from the base by a further ½" 6 B.A. Bolt, which is fitted with a Terminal 5.

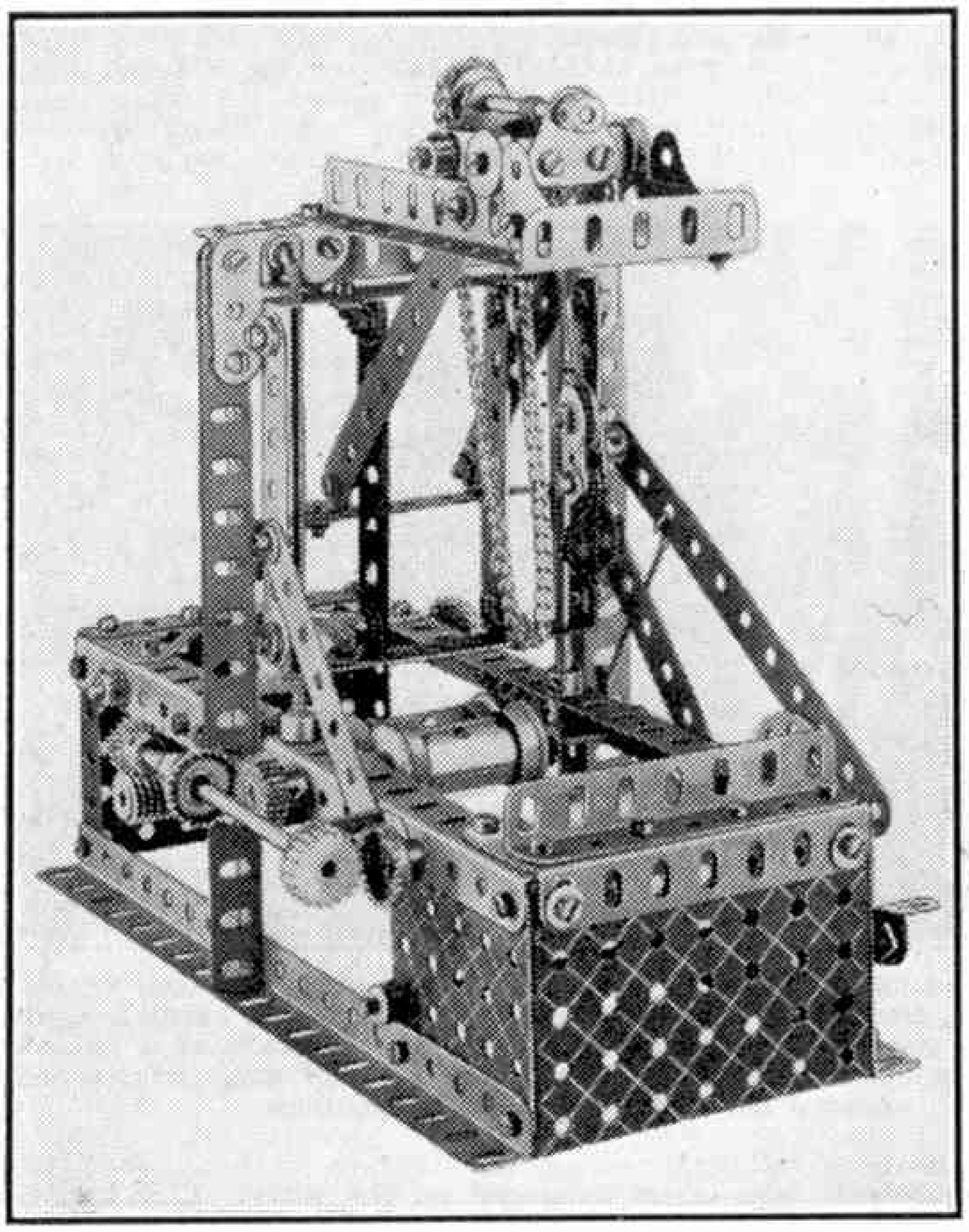
One terminal of the solenoid is earthed to the base, and the other is connected to a key, the second terminal of which is joined to one battery terminal, the other being connected to Terminal 5.

Meccano Model-Building Competitions

By "Spanner"

What is Wrong with this Model?

At this time of the year Meccano enthusiasts spend most of their time out of doors, and with this in mind we have for our August contest one that does not require actual construction, so that the solution can be found in a quiet hour in the garden or on the beach. It centres round the model illustrated on this page. This is supposed to be a miniature of a vertical log saw, but every Meccano boy will see at a glance that this has been badly built, and indeed is bristling with ridiculous faults. We want readers to find these faults, and to send us a list of them, together with their comments on the manner in which the constructional work should be corrected.



Prizes are offered to readers who can find the greatest number of mistakes in this wrongly constructed model.

Any reader who "spots" most of the errors and sets them down briefly but clearly will have a splendid chance of winning one of the principal prizes. The errors should be written in column form, and against each item in the list there should be a short note explaining how the error should be corrected. If necessary small explanatory sketches can be added.

The prizes to be awarded are £2/2/–, £1/1/– and 10/6, and in addition there will be consolation prizes of 5/– each. Entries should be addressed "*August Errors Contest, Meccano Limited, Binns Road, Liverpool 13,*" and the closing date is 31st August. There will be an Overseas Section with similar prizes, and the closing date is 31st December.

Aircraft Contest

The outstanding interest taken by model-builders in model aircraft construction is apparent from the number of entries based on these subjects that were submitted in the Aircraft Contest announced in the March, April and May issues of the "*M.M.*" These showed that many model-builders are fascinated not only by modern machines, but also by older types such as the D.H. "Hornet" and "Tiger Moths," Gloster "Gladiators" and the various Hawker biplanes, while flying boats also proved popular, particularly the amphibian Supermarine "Walrus."

The complete list of prize-winners in both Sections of the Contest is as follows:

SECTION "A." 1st Prize, Cheque for £2/2/–: W. Hogbin, Ramsgate. 2nd, Cheque for £1/1/–: D. Thorne, Liverpool 23. 3rd, Postal Order for 10/6: K. Prentice, Lanark. Consolation Prizes, Postal Orders for 5/–: A. Grant, Aberdeen; D. Faulkner, London S.W.1; J. Allan, Hamilton; C. Young, London S.E. 24; J. Kennett, Gerrards Cross.

SECTION "B." 1st Prize, Cheque for £2/2/–: D. Mills, Ilford. 2nd, Cheque for £1/1/–: J. Cutler, Steep, Nr. Petersfield. 3rd, Postal Order for 10/6: D. Eccles, Southport. Consolation Prizes, Postal Orders for 5/–: F. Martin, Bournemouth; A. Webb, London S.W.18; A. Pickard, Sutton; A. Ricks, London N.W.10; J. Friend, Peebles.

The First Prizes in Sections A and B were awarded to W. Hogbin, Ramsgate, and D. Mills, Ilford, for a fine model of a single-engined monoplane and a close reproduction of the Fairey "Seafox" respectively. W. Hogbin's model has a length of 2 ft. 9 in., with a wing span of 3 ft. 3 in., and is constructed from Flexible and Flat Plates bolted to a framework of Angle Girders. A very realistic cockpit is formed from Strips moulded to the required shape, and the model is fitted with a wireless aerial formed from a short Rod fixed by a Threaded Pin to the top of the fuselage and connected by a length of Cord to the fin and rudder. A noteworthy feature is the fitting of detachable wings.

The model "Seafox" submitted by D. Mills is a fine reproduction of this single-engined seaplane, its wings of equal span being well braced by Double Angle Strips and Cord. The floats consist of Angle Girders rounded off at their forward ends by Strips bent to the required shape, and secured to the fuselage of the plane by Strips and Obtuse Angle Brackets. The model is fitted with a radiator formed from a Sleeve Piece bolted to the underside of the fuselage.

The Second Prize in Section "A" was awarded to D. Thorne, Liverpool, for a realistic model of the Vickers "Wellington" bomber that is constructed to a scale of approximately ½" to 1 ft. The model is fitted with gun turrets, each consisting of Strips bent to the necessary shape and covered with a small piece of celluloid. Each of the twin dummy engines and cowlings is formed from two Boiler Ends attached to the engine nacelles, which are built up of Flexible Plates, and provide bearings for the shafts carrying the three-bladed propellers.

Second Prize in Section "B" was presented to J. Cutter for an interesting model of a heavy twin-engined bomber with a rotable gun turret in the nose and a second gun turret at the rear.

Club and Branch News

WITH THE SECRETARY

TREASURE YOUR NUTS AND BOLTS

It is not easy to provide all the Nuts and Bolts that are wanted by Club members for building models at meetings, or at home. These parts are small, and before the war were liable to rather careless treatment! Now we appreciate that without them it is impossible to build models, however many other and more imposing parts may be available. For this reason immediate steps should be taken in all Clubs to collect all the Nuts and Bolts available and to store them in a safe place. They can be loaned to members in need of them, and careful account should be kept of them so that they may be returned to the general store when the models in which they are used are dismantled. By following this practice the utmost use will be made of the existing store of the parts, and losses will be diminished.

Opportunities of adding to a Club stock of Nuts and Bolts will be very rare indeed for the war period. Possibly older people connected directly or indirectly with the Club may have packed away somewhere, perhaps in a lumber room, a forgotten box or other container of Nuts and Bolts. I have myself heard of instances in which the turning out of lumber rooms for salvage has brought treasure of this kind to light, and members should keep a keen lookout for such windfalls.

SALVAGE EFFORTS

Mention of lumber rooms leads me to wonder if Clubs and Branches are doing all that they can to help in the nation's Salvage Campaign. If a Club room is harbouring old papers or metal or other articles for which salvage authorities are calling, these should be handed over at once. When this has been done efforts can then be made to find salvage elsewhere. Every little helps, but that little is most effective when done systematically. Members should be encouraged to bring in as much paper, cardboard, old metal and other wanted material as possible, and this should be carefully sorted and packed. If any of the collection is sold, the money raised could be used for Club purposes, but would best be devoted to local war funds of some kind.

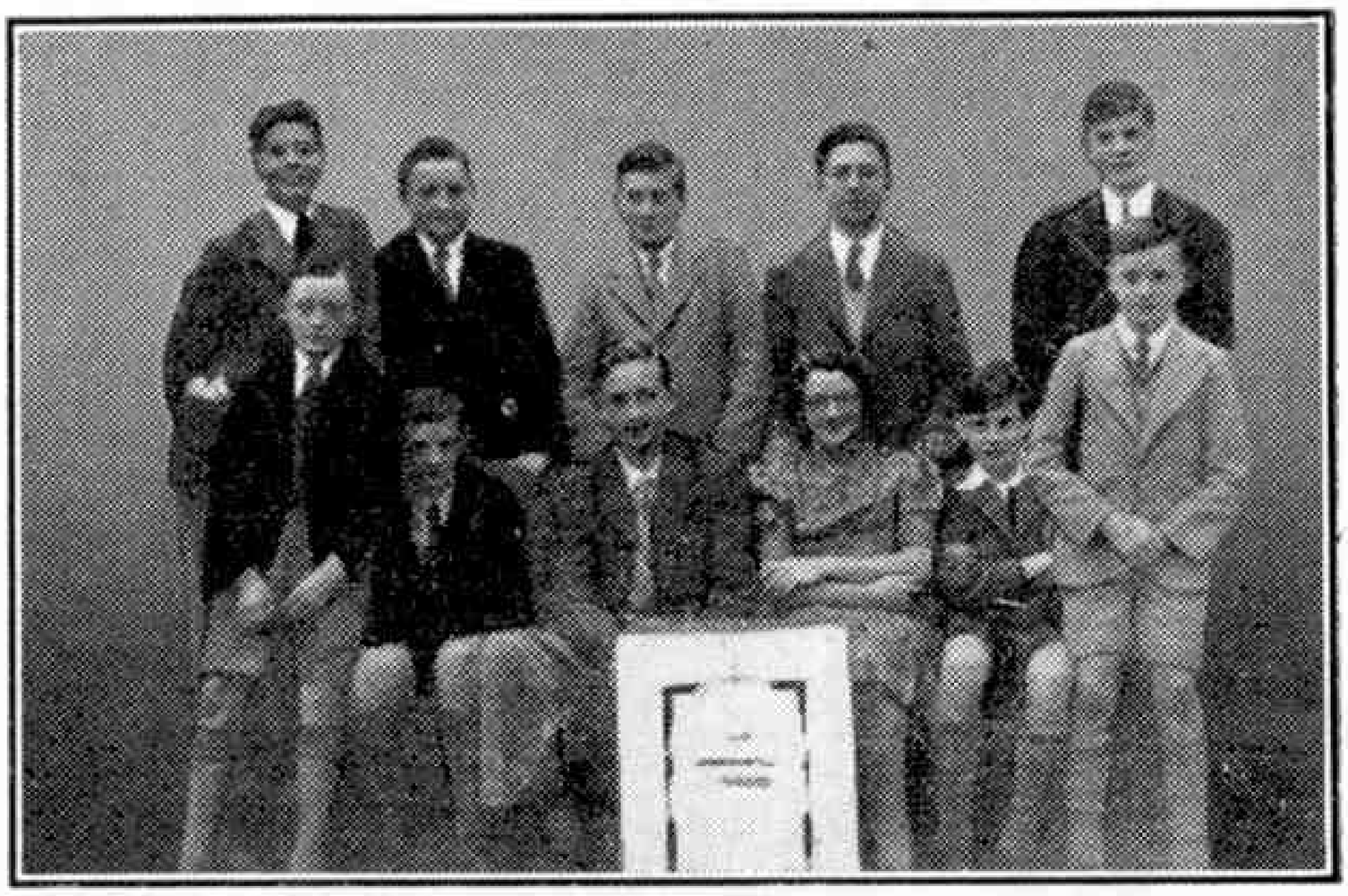
I hope that Clubs and Branches that have not yet interested themselves in salvage will at once see what can be done. Officials may think that plenty of people are busy looking out for waste material, but these are always liable to overlook valuable spoil, and it is for Clubs and Branches to make sure that no "waste" is being left in unsuspected corners.

Club Notes

EXETER M.C.—Interesting model-building work has been continued, and Mr. Hodder, Leader, has built a mystery model that has caused great excitement. An Aircraft Section has been formed and is doing splendid work. Besides making models of famous aircraft, members have turned their attention to helicopters and aircraft of the future, including some designed for travelling through space. Club roll: 150. *Secretary:* K. Addicott, 46, Ladysmith Road, Exeter.

BARNARD CASTLE SCHOOL M.C.—Continued model-building activity prevails, models built including a mobile crane, a dockside crane driven by steam and a vertical lift bridge. The Club's first Secretary, R. Churchill, is now assistant Leader and Treasurer. Club roll: 17. *Secretary:* P. W. Garvin, The School, Barnard Castle.

TOTNES M.C.—The Club now has a larger room, with better facilities for games. A Table-Tennis Tournament between "Nuts" and "Bolts" was won by the "Nuts." Outdoor pursuits are now being followed. An auction has been held, at which new books were purchased for the library. Club roll: 15. *Secretary:* P. Pascall, The Gables, Totnes.



Officials and members of the Hillside (Whitefield) M.C., with their Leader, Mrs. H. N. Norbury. D. L. Johnson, Secretary, is on the Leader's right. This Club was affiliated in November 1940, and has followed a fine all round programme of model-building, aircraft recognition, lectures and general knowledge and other competitions.

Branch News

WEST WICKHAM.—Meetings are held twice weekly, and the Branch track has been laid down in a new Branch room. Locomotive hauling capacity has been tested on a suitable track, and monthly tests of railway knowledge have been introduced. *Secretary:* A. G. Edmeads, 67, Silver Lane, West Wickham.

COLWYN BAY.—The Branch track has been laid down in a garden, the main line following a shelf along a rockery. At one end there is a goods yard that gives opportunities for shunting practice. Gravel is used for ballast, and Meccano Bridges are being constructed. Laying the track was excellent practice, during which members learned much about levels and gradients. *Secretary:* W. M. Evans, "Mervyn," Victoria Park, Colwyn Bay.

ACTON.—The new Branch layout has been further considered, and model buildings designed for it. A "Rialway Quiz" has been held, and Mr. H. B. Boreham has given a Lecture on "*The Blagdon Mineral Line.*" *Secretary:* S. W. Simmons, 38, Derwentwater Road, Acton, London W.3.

Hornby Railway News

Developments on the "Nutland Railway"

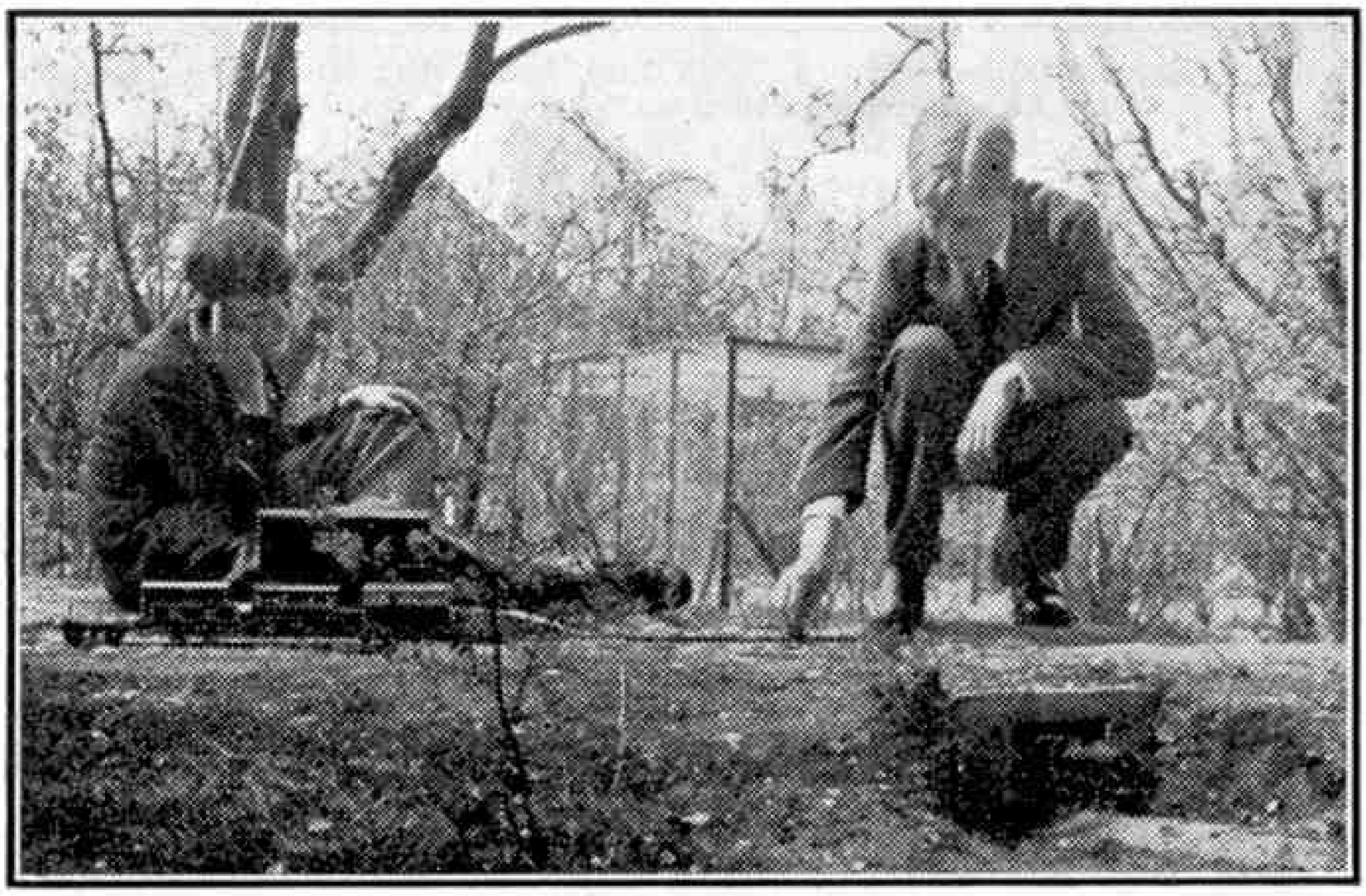
EXACTLY a year ago, in the August 1941 "*M.M.*," we gave a description of the "*Nutland Railway*," an outdoor system in Gauge 0 that is laid down on a piece of ground on which nut trees grow; hence the name of the line. Since then various interesting developments have occurred, for the "*Nutland Railway*," like most miniature systems, is constantly being improved to afford more realism in operation and in general effects. These developments form the subject of the present article.

We will deal with the engineering developments first. At the time of the original article the railway consisted of a continuous track affording a run of approximately 100 ft. in a single circuit. From one of the stations on the main circuit, then named "*Ashton Halt*" but now called "*Ashton Junction*," a branch line has been carried to the summit of the bank on which the line is situated. A feature of the layout is the incorporation of gradients as a result of the nature of the site. Between "*Ashton*," the summit of the old system, and the end of the new branch line, there is a difference in level of about one foot. Therefore to ease the gradient as much as possible it has been necessary to choose a rather indirect route; and, incidentally, a new tunnel some 5 ft. long has had to be driven. Another item that became necessary was a retaining wall to support the embankment at a point where the new line, at a higher level, passes the original track.

The path of the branch line is somewhat sinuous for it curves off from the main track to the right and enters the tunnel mentioned previously. Emerging from this it curves round to the left on an embankment and is by now some way above the original line. Still rising it goes right round and, in a manner similar to the famous "spirals" in the Alpine regions, it crosses over the top of the tunnel and at last reaches "*Barnfergen Hill*" station, now the summit of the line. This is the point that appears in the accompanying illustration where the tunnel mouth and the line above it are shown.

No change has been made in the motive power of the line, for which Hornby clockwork locomotives are used for the most part. These cope with the gradients quite successfully with loads suited to their capacity, and of course the care taken in surveying the line generally has an influence in this direction. Clockwork engines are very suitable for outdoor work, for electrical operation, where the track is permanently laid down outside, involves a great deal of maintenance, chiefly on account of insulation troubles. Steam power of the ordinary kind is not very successful as a rule unless the engines are exceptionally well handled.

Turning now to the operational developments, a most fascinating system of traffic control has been brought into use. Originally an orderly system of working to timetables was in force, and four operators dealt with the complete services laid down in the working sheets. Two operators were posted at each of the two main stations, which were linked by means of electric buzzer communication.



A scene on the "Nutland Railway." This shows on the upper line a train at "Barnfergen Hill," and on the line below it a train emerging from the tunnel. The details in this article, also the photographs, were received from C. J. Morris, Berkhamsted, the owner of the line, who is seen on the right. The Stationmaster is receiving a message from the Controller.

Colour light signals are still used to regulate the movement of trains but the management of the traffic is now performed by a "Controller," or Chief Operator. He is placed in a room inside the house, some distance away from the track, but he is in communication with the stationmasters at the various stations by means of a home-made telephone system. He informs them what trains are to run and at what time. The Control 'Office' and the stationmasters have clocks which are synchronised at the start of operations, and to make it easy to refer briefly to any particular engine or item of rolling stock, each of these has a number or letter allocated to it. Numbers are used for the engines and letters for the rolling stock so that they can readily be distinguished.

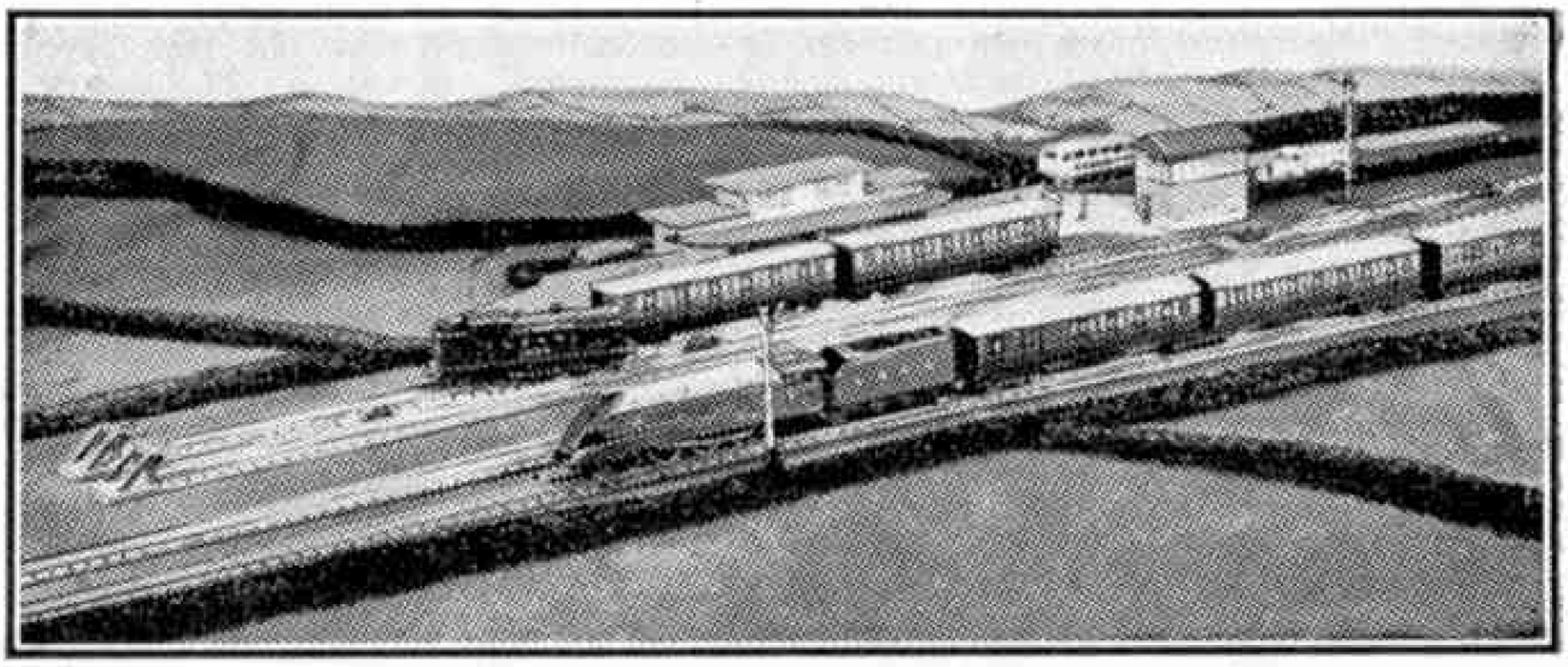
The movements of trains are reported to "Control" as they occur by the respective stationmasters, and the "Controller" marks them down on a chart. He is thus kept constantly informed of the disposition of the stock throughout the period of working, and can send instructions for any alterations in movements that may be necessary from time to time. Formerly records of train movements were entered on "Train Sheets" by the operators, but there was no centralised control of traffic. The "Controller" is in fact very definitely a "key-man," and the scheme reproduces in a simple way the traffic control system that is in common use in actual practice.

Technical details of the telephone installation are of special interest. The number of wires necessary from the Control room to the stations has been reduced to two as the result of careful planning and experiment. A novel method of "ringing up" is adopted, for by means of an induction coil a (*Continued on page 302*)

Working Your Dublo Station

STATION working is one of the most interesting features of a Hornby-Dublo railway, and if the various operations are carried out in the right way it provides an endless amount of fun and excitement.

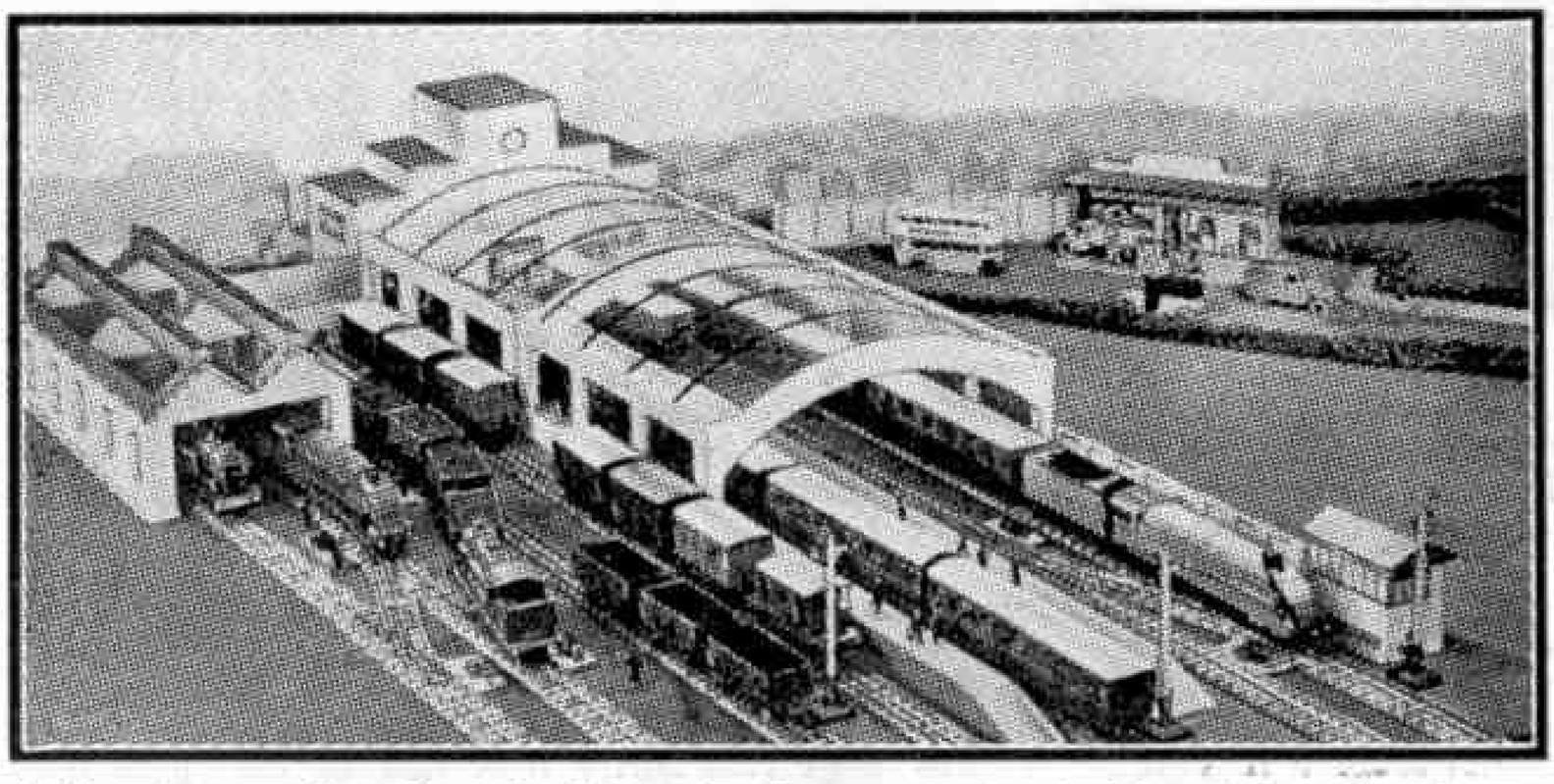
For the ordinary type of passing station, the Hornby-Dublo Main Line Station is as a rule the first choice. It can be used on an ordinary single line layout, or two of them can be used together to serve the up and down roads of a double track railway. Another possibility is the use of a Main Line Station in conjunction with a standard Dublo Island Platform. If there is to be a goods yard where shunting will be carried out, good use can be made of one or other of the diagrams that have appeared in recent issues of the "*M.M.*" Ordinary passenger or express traffic will require no special provision beyond the placing of the station alongside the main track. Then stopping trains will call at the station regularly, and at times no doubt an express will call. Stops are sometimes made at quite small stations by expresses for various reasons. Possibly a mail bag or two is collected, or there may be some particular traffic in small quantities that is dealt with by express passenger trains. At times, too, the particular station may be the nearest for a larger centre that is not on the railway; in that case there will no doubt be a connecting road service in which the railway company has an interest. The younger members of the operating staff take a great delight in working "road motor services" of this kind, and if they connect with the trains then the fun is all the greater. For this purpose the Dinky Toys Motor Buses No. 29b or 29c are very satisfactory.



A simple wayside station where a Dublo Tank Locomotive is running round its train. An express is passing on the through main lines.

The wayside station, on the other hand, may have to act as the terminating point of a suburban service operating between there and the main terminus on the layout. When this is so it will be necessary to provide means of running the engine round its train in order to make the return journey. This involves the laying down of a loop line for this purpose if the layout is single track; if it is double track two sets of crossover points will be required. Hornby-Dublo Track components have been specially designed to make such arrangements as these easily possible. The upper illustration shows the engine of a suburban train "running round" at the end of a trip at a simple wayside station.

The schemes dealt with so far can be varied or developed according to the importance of the station and the space and material available. Similarly a large "through" station or a terminal, built up in the standard manner with the components of the City Station Outfit, can be varied in its actual arrangement. The lower illustration shows an effective scheme that incorporates a terminus station and an Engine Shed. The main line trains have their own platforms for arrival and departure, and alongside the main departure platform there is an express ready to start. Local or suburban trains are dealt with separately, and one can actually be seen on what we may call the "suburban side" of the station in the same illustration. At times, of course, it may be more convenient to vary the platforms used by different trains, and this should not be overlooked in arranging the points connecting the various tracks outside the station.



A terminus and engine shed layout. Express and suburban trains are shown and there is a train of perishable vans alongside the platform reserved for this kind of traffic.

As a general rule space does not permit of "run round" facilities in the station itself, and therefore it is usual to adopt the scheme of having a fresh or "turnover" locomotive to take an arriving train out on its next run. Where locomotive power is not sufficient for this scheme it is usually possible to provide either loop lines or their equivalent outside the station. Then arriving engines back their trains out, run round, and back them in again ready for departure. This makes for some interesting signal and point operations apart from the engine and train movements.

Finally, parcels and perishable traffic can be dealt with at the terminus in the manner shown in the lower illustration.

A G.W.R. Dublo Tank Locomotive operating a freight train on a miniature L.N.E.R. system. Similar sights to this are quite common to-day in actual practice.

Fun With Your Hornby-Dublo Railway

Trains of Varied Vehicles

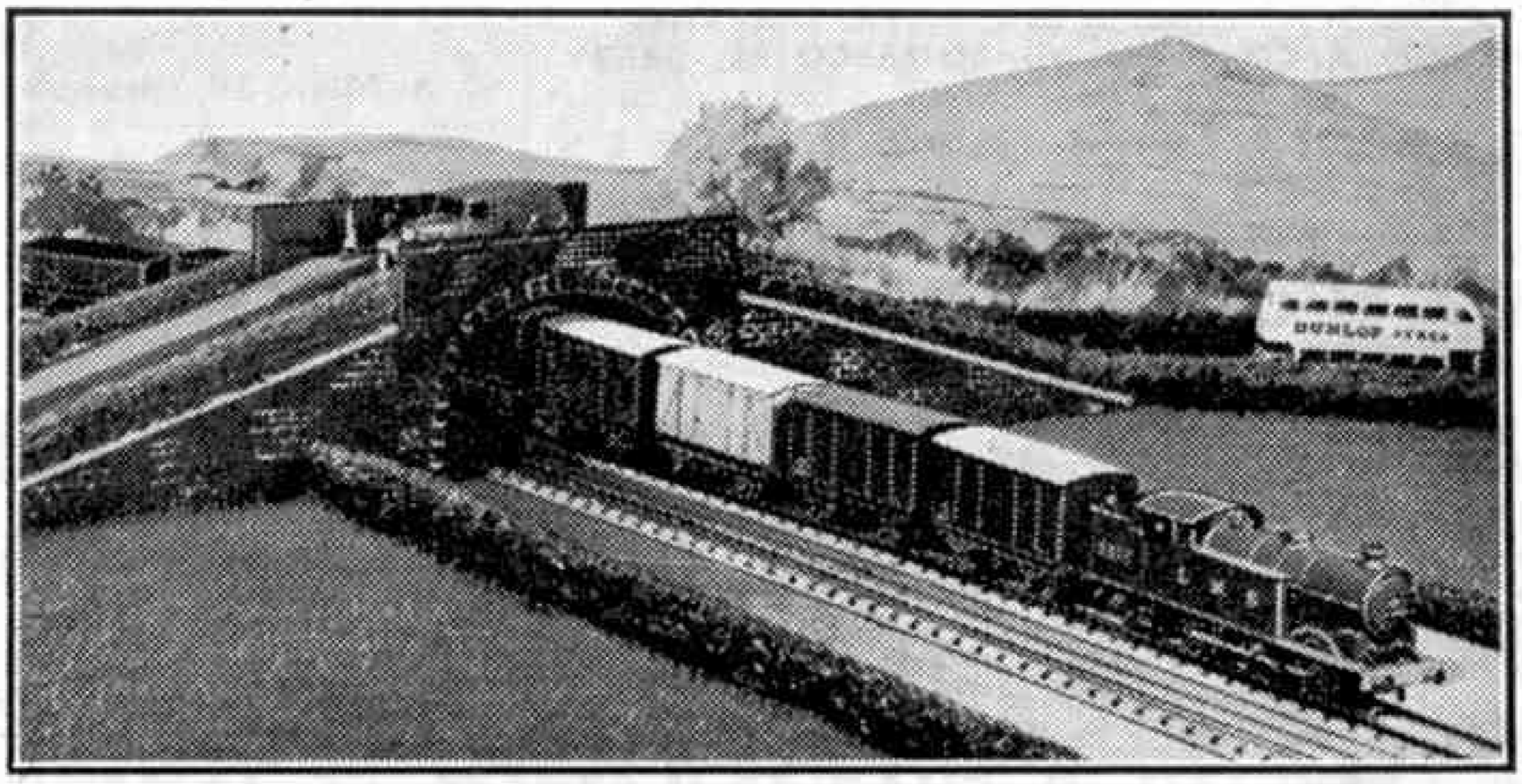
MOST of the recent articles dealing with Hornby-Dublo trains have contained suggestions for the carrying out of more or less normal operations. By way of a change we propose to devote this page to working of a less usual character.

Wartime railway working provides plenty of examples for those who like to use a variety of rolling stock, and even locomotives, representing the practice of the different companies. Even in ordinary times of course there is a great deal of common use by the four main line systems of each other's rolling stock. For the most part, however, this is confined to the ordinary standard open and covered vehicles that are represented by the Wagon D1 and the Van D1. Vehicles for special traffic such as Meat Vans, Fish Vans and so on often work through from one system to another, but they are returned as soon as possible, often to some particular traffic centre, the name of which is marked on the vehicle concerned. Often vehicles of this kind are kept to their own systems on which they have practically regular "runs."

Now in miniature we often like to assemble quite an assortment of goods stock into one train, just to be "different"; and the present-day interworking of vehicles, as explained previously, gives us plenty of excuse and so we can have a great deal of fun in this way. Recently a really good assortment of stock was observed in a train, and this could quite well be reproduced in miniature. The engine was an L.N.E.R. one, but in our miniature version it might equally well be L.M.S.; thus the standard Dublo tank locomotive in either company's style could be used. Next to the engine there was a G.W.R. goods brake van, and this vehicle, incidentally looking very out of place, was followed by a string of G.W.R. "special" vehicles. These vans could be represented quite well by the G.W.R. Goods Brake Van and Goods Vans, D1. These vans carry the notice "*Return to G.W.R. Not common user*," so that they fit into the scheme perfectly. The remainder of the train consisted of a variety of vans of similar type, and this could be made up quite easily, including the S.R. Meat Van, D1 and the L.M.S. Cattle Truck, D1, each of which carries the letter "*N*" on its sides. This letter signifies that the vehicle is not to be used in any "common user" or wagon "pooling" scheme in ordinary times. Finally the real train ended with an L.M.S. brake van; in our reproduction this could be either L.M.S. or L.N.E.R. Readers will agree that not much more variety could be sandwiched into a single train; yet it is typical of the mixtures of stock that can now be seen daily in real practice.

As with wagons, so with locomotives, and it is nothing unusual nowadays to find the engines of one or more companies working on the system of another, many miles perhaps from its "native heath." This explains the situation seen in miniature in the upper illustration on this page. Here we have a G.W.R. Tank Locomotive, with a Brake Van of its own company, working a mixed goods train on a system representing the L.N.E.R., for on the main line there is an express headed by the well-known streamliner "*Sir Nigel Gresley*."

Important traffic at times now takes routes that were little used in pre-war days. So in miniature we have in the lower illustration a van train hauled by a Dublo Standard Tank D1. Often such trains run regularly in connection with a particular traffic that now originates in some remote spot or possibly is routed in a particular way for operating reasons. So we can imagine that our Hornby-Dublo layout, quite a small one perhaps and possibly only single-track, has to cope with regular heavy traffic for which a number of vehicles must always be found. Working out a reason for running of this kind adds to the fun.



A van train carrying special traffic as suggested in this article. The engine is a Standard L.M.S. 0-6-2 Tank D1.

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Stamp Collecting

Egypt's Story in Stamps

THE long history of Egypt is reflected in its stamps, which have always appealed strongly to collectors. They are attractive as stamps, and remarkable also for the blend of the ancient and modern worlds that marks their designs. The latter feature is best illustrated by the issue of February 1933, in values from 1 m. to 200 m., showing an aeroplane flying over the Pyramids. This is reproduced in the centre of this page.

The pyramid and the sphinx have always been characteristic of ancient Egypt, and we find one or both of these on stamps of many Egyptian issues, beginning with the very earliest, that of 1866, on one of which was a somewhat crude representation of a pyramid. The sphinx, that mythical creature with the body of a lion and a human head, was introduced with the issue of 1867, and a pyramid and sphinx appear together in various designs on the Egyptian stamps that were current from then until 1914. One of these stamps is illustrated on this page.

The greatest days of pyramid building in Egypt were before 2000 B.C., and the stamps on which pyramids appear therefore can be taken as illustrations of the most ancient glories of Egypt. It was in the age of the pyramid builders that we hear of the first recorded physician. This was Imhotep, who lived about 2980 B.C., and was chief minister, architect and physician to an early Pharaoh whose pyramid was the first built in stone. A seated figure representing him appears on one of two stamps issued in December 1928 to celebrate the International Medical Congress held in Egypt in that year.

The next stage in the history of Egypt that is illustrated by our stamps was one in which conquest played a great part, for in later centuries the dominion of the Pharaohs spread over neighbouring countries in both Africa and Asia. By the time of Amenhotep III, approximately 1400 B.C., the Empire of the Pharaohs extended from Nubia, roughly the modern Sudan, to the Euphrates in Mesopotamia. A statue of Amenhotep III is seen on three stamps, of values 5 m., 10 m. and 15 m., issued in December 1927 on the occasion of a Statistical Congress in Cairo. The 15 m. value is shown in the upper right-hand illustration on this page.

The greatest figure in the long line of Pharaohs undoubtedly was Rameses II, who ruled about 1300 B.C. to 1225 B.C. and was famous for his great wars against the Hittites, a powerful race of Asia Minor and Syria. Rameses lived to a very great age, and the later part of his long reign was given up to immense building schemes. There is some evidence that he was the Pharaoh of the Bible, and this fact gives special interest to two stamps of 1922, each of 15 m. value, that bear a representation of his statue. One of them is shown in the lower right-hand illustration on this page.

With the death of Rameses the Empire fell into decay, and eventually Egypt was overrun first by the Assyrians and the Persians, and then by the Greeks under Alexander. After the death of the latter the country was ruled by Ptolemy, one of his Generals, and under him and his successors again became prosperous. For this period of its history we have a stamp of the 1914 issue, the 2 m. value, showing Cleopatra adorned with the head-dress of Isis, an ancient Egyptian goddess. It was in Cleopatra's reign that Egypt became a Roman province, and it remained part of the Roman Empire until the Arab conquest in 639.

During the following centuries the country underwent many changes of rulers, and this long period in its history is not illustrated by stamps until we reach the 19th century, when it was part of the old Turkish Empire. The country was in a state of chaos and revolt owing to the tyranny of the Pashas who exercised power. The revolt centred round Mehemet Ali, who eventually became undisputed master of the country and for a time extended his sway over the Sudan, Syria and part of Asia Minor. He was finally acknowledged hereditary Pasha of Egypt. A fine portrait of him appears on one of the two stamps, already referred to, that were issued in 1928 in commemoration of the Medical Congress held in Egypt in that year. The stamp is illustrated in the lower left-hand corner of this page.

In 1863 Ismail Pasha, a grandson of Mehemet Ali, became Pasha and he soon acquired the title of Khedive and secured further concessions from Turkey that made him an almost independent ruler. He sold his shares in the Suez Canal to Great Britain, an event that led to Anglo-French control of the Canal. Portraits of Ismail Pasha appear on stamps issued in February 1934 to celebrate the 10th Congress (*Continued on page 301*)

A.A. GUN STAMP FREE

Would you like an Anti-Aircraft Gun Free? **YOU** can get one sent you, as shown on the **UNITED STATES OF AMERICA** War Stamp illustrated, which is one of a set issued for American Defence. It will be sent to you **ABSOLUTELY FREE** together with some more stamps among which you will get a very attractive and now obsolete stamp of **IRAQ** which has been used on Official Business and a very unusual and large stamp of **HYDERABAD**. In addition and also **ABSOLUTELY FREE** there will be included a selection of **BRITISH DOMINIONS** stamps with a nice pictorial in two colours; Service stamps; stamps showing animals and birds; withdrawn stamps and Royal Stamps; stamps from all parts of the world; stamps from **INDIA**, **AUSTRALIA** and **SOUTH AFRICA**. Finally, in this packet is a King George and Queen Victoria large commemorative which was only on sale for a short time. **YOUR COLLECTION** will not be complete without this wonderful lot of stamps, which you can obtain **ABSOLUTELY FREE** by sending 3d. in stamps to cover postages to THE WINDSOR STAMP CO. who will then send you this lovely packet and an attractive selection of stamps on approval.

Address your applications to WINDSOR STAMP CO. (DEPT. M), UCKFIELD, SUSSEX

1/6 Used AUSTRALIA Hermes and Globes FREE
This beautiful stamp which is used on AIR MAIL letters will be sent FREE to all applicants who send 2½d. for postage and ask to see a selection of my "WORTH WHILE" approval sheets.
JOS. H. GAZE, 10, Pimlico Road, CLITHEROE, Lancs.

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Egypt ..	35	65	90	135	Burma ..	15	22	33	40
Greece ..	60	100	125	150	Ceylon ..	35	50	65	85
Iran (Persia)	50	75	125	175	China ..	45	65	85	110
Iraq ..	35	50	75	100	F.M.S. ..	20	28	32	38
Palestine ..	25	40	58	67	Hong Kong	20	35	52	65
Saudi-Arabia	12	18	28	40	India ..	50	100	125	145
Sudan ..	15	25	37	50	Japan ..	55	65	80	110
Syria-Leban.	25	38	60	75	N. Borneo..	18	30	50	80
Trans-J'rd'n.	15	25	45	60	Siam ..	30	50	80	100
Turkey ..	60	110	150	200	Straits Setts.	25	40	65	90

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COX, 17, STONELEIGH PARK ROAD, EWELL

FINE FREE GIFT PACKET To all requesting our astounding value discount approvals. We have a really fine selection of PICTORIALS, COMMEMORATIVES and TRIANGULARS, etc., at bargain prices.
ALLCOCK, 74, Tynyparc Road, Rhiwbina, CARDIFF

COUNTRIES MENACED BY "THE YELLOW PERIL"

8 FREE stamps from Australia, New Zealand and India to all applicants for our World Famous Approval Sheets sending 3d. to cover cost of postage.

Dept. 378, ERRINGTON & MARTIN
South Hackney, London E.9. Est. 1880

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COLONIALS, FOREIGN or AIR MAILS.
Pick any from our celebrated APPROVALS.
20/- worth as priced for **5/-**, and *pro rata*.
OLD AND RARE STAMPS BOUGHT.
SAUNDERS & CO., 51, Draycott Avenue, HARROW

Catalogued 10d., 2/6, 6/—penny each! Approval, 3d. postage please. J. Baguley, Weston Colville, Cambs.

FREE POLAND

The Polish Government in Great Britain has issued stamps for use by the Polish Forces and Merchant Marine. I have a few used covers bearing a set of three, price 1/- each, postage extra.

DE GAULLE 1942

Cameroun is the first of the Free French Colonies to issue a new set of stamps, having the words 'France Libre' in the design. I offer three of this historic issue entirely free to all applicants for approvals enclosing 2½d. postage.

R. D. HARRISON — ROYDON — WARE

GLOBE-TROTTER CELEBRATES HIS RETURN!

WITH AN AMAZING FEAST OF STAMPS FOR YOU AND EVERY READER OF "MECCANO MAGAZINE."
From every corner of the globe, from every country, "Globe-Trotter" has collected together the most attractive of the world's stamps, so that you may increase your stamp collection at an amazingly low cost.

FREE—**ANOTHER STUPENDOUS CELEBRATION PACKET** containing scarce **Abyssinia Red Cross**, last issue Burma (mint), mint Air Mail, large mint Prince Badonin (Belgium), British Col. K.G.VI, Free French Pictorial, Mozambique, India, etc. For every applicant for Globe-Trotter "little black" Approval Books of Pictorials, Triangulars, Air Mails, etc. Write now enclosing 3d. postage.

GLOBE-TROTTER, 70, West Avenue, Handsworth Wood, Birmingham

For other Stamp Advertisements see pages 298 and vi.

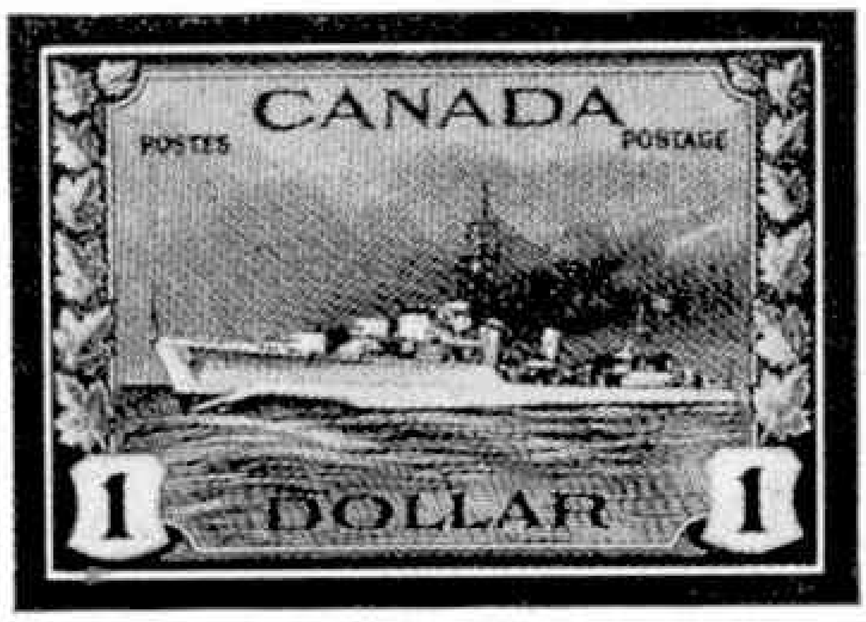
Stamp Gossip

and Notes on New Issues

A Fine New Canadian Series

Canada's contribution to the war effort of the United Nations is reflected in a splendid series of stamps issued on 1st July. There are 14 stamps in the series, of which two are air mail stamps, and the designs of most of them illustrate actual Canadian war work.

The stamps included in this set are as follows: 1c., green, 2c., brown, 3c., red, and 5c., blue, various portraits of King George VI in uniform; 4c., grey, grain elevators; 8c., sepia, farm scene; 10c., brown, Parliament Buildings, Ottawa; 13c., dark green, a "Ram" tank; 20c., brown, a corvette on the stocks; 50c., violet, munitions factory; $1, blue, destroyer. The air mail stamps are of values 6c. and 16c., and are blue and violet-blue in colour respectively. The design of the former shows an aerodrome, and illustrates the Empire Air Training scheme; that of the latter depicts a Trans-Canada aeroplane and is a special delivery stamp. The remaining stamp in the series, of value 10c., is a green special delivery one, the design showing the coat-of-arms and flags of Canada.



For the Animal Collection

We have several times suggested that an interesting special collection of stamps picturing animals could be made, and readers who have adopted this suggestion will be specially interested in the new British Somaliland issue. Of the lower values of this issue those from ½a. to 3a. show a black-headed sheep, with a miniature portrait of King George VI inset, while the values from 4a. to 12a. feature a head of the greater kudu antelope, also with an inset portrait. These stamps are similar to those of the issue of May 1938, but a new full-face portrait is incorporated. The values from 1r. to 5r. in the same series show a map of the Somaliland protectorate, also with the inset portrait.

Australia also contributes new specimens for an animal collection in the new 3½d. and 5½d. values. There are Australian blue wrens in the bottom corners of the lower of these values, which bears also a portrait of the King, and the 5½d. stamp features what has been described as the best picture of the emu yet seen on stamps.

The New Gibbons Empire Catalogue

The 1942 Gibbons British Empire catalogue is late in making its appearance owing to the fact that the standing type and blocks were destroyed or made useless by enemy action during 1941. As usual this invaluable publication includes details of new issues, up to the time of going to press, in its comprehensive lists of stamps of the Empire, Egypt and Iraq, but perhaps its most interesting feature is the number of price alterations, amounting to many hundreds, mostly increases. Values at present are liable to very rapid changes, and some of the quotations given may already be obsolete.

The number of copies of the Catalogue printed is not large, and readers who are interested will be well advised to secure a copy at the very earliest possible moment. The price is 10/–, postage in the United Kingdom 7d., abroad 10d. and the exact amount should be forwarded with orders by post, which should be addressed to Stanley Gibbons Ltd., 36-38, London Road, St. Albans, Herts.

Stamps of Egypt —

(Cont. from page 299)

of the Universal Postal Union, held in that year in Cairo. The design used for the lower values, from 1 m. to 200 m., is illustrated on this page, and a three-quarter length portrait appears on the two highest values, 50 p. and £1.

A stamp issued in three values in December 1936 is of special interest as marking the commencement of a new era in the country. For many years Egypt had been under British protection, and in 1936 a treaty was signed by which the country again became independent and an ally. The stamp shows the treaty delegates with Nahas Pasha, then Prime Minister and now once more head of the Egyptian Government.

* * * *

It is announced that all South African stamps are to be halved in size in order to conserve paper. The changes will be made as the present stocks are exhausted, and there will be no alterations in design. The 1½d. stamp has already appeared in the new size.

Railway Working in India—I

(*Continued from page 275*)

confronting the carriage designer. It might be imagined that in these days air-conditioning would solve most of the problems of providing pleasant travelling in a country of hot climate, or one where there is considerable difference between temperatures at night and in the day. On a line like the North Western, for example, some of the routes traversed require a supply of cooled clean air in the summer, but in winter, with a minimum temperature of about 30 deg. Fah., the air requires to be heated; on other routes of the same system no heating at all is required. Taken generally the Indian railways have not made quite so much progress as one might expect in this way; but in comparing developments, particularly with those in America, it must not be forgotten that from the earliest days the Indian railways fitted louvred shutters to the carriage windows—and incidentally to the locomotive cabs—which provided shade from the sun and at the same time induced a breeze from the motion of the train. Travel in many parts of India, particularly in the dry season, is, however, subject to the all-pervading dust which, more than any other factor, hastened the development of effective air-conditioning in the trains of the United States.

(*To be continued*)

COMPETITION RESULTS

HOME

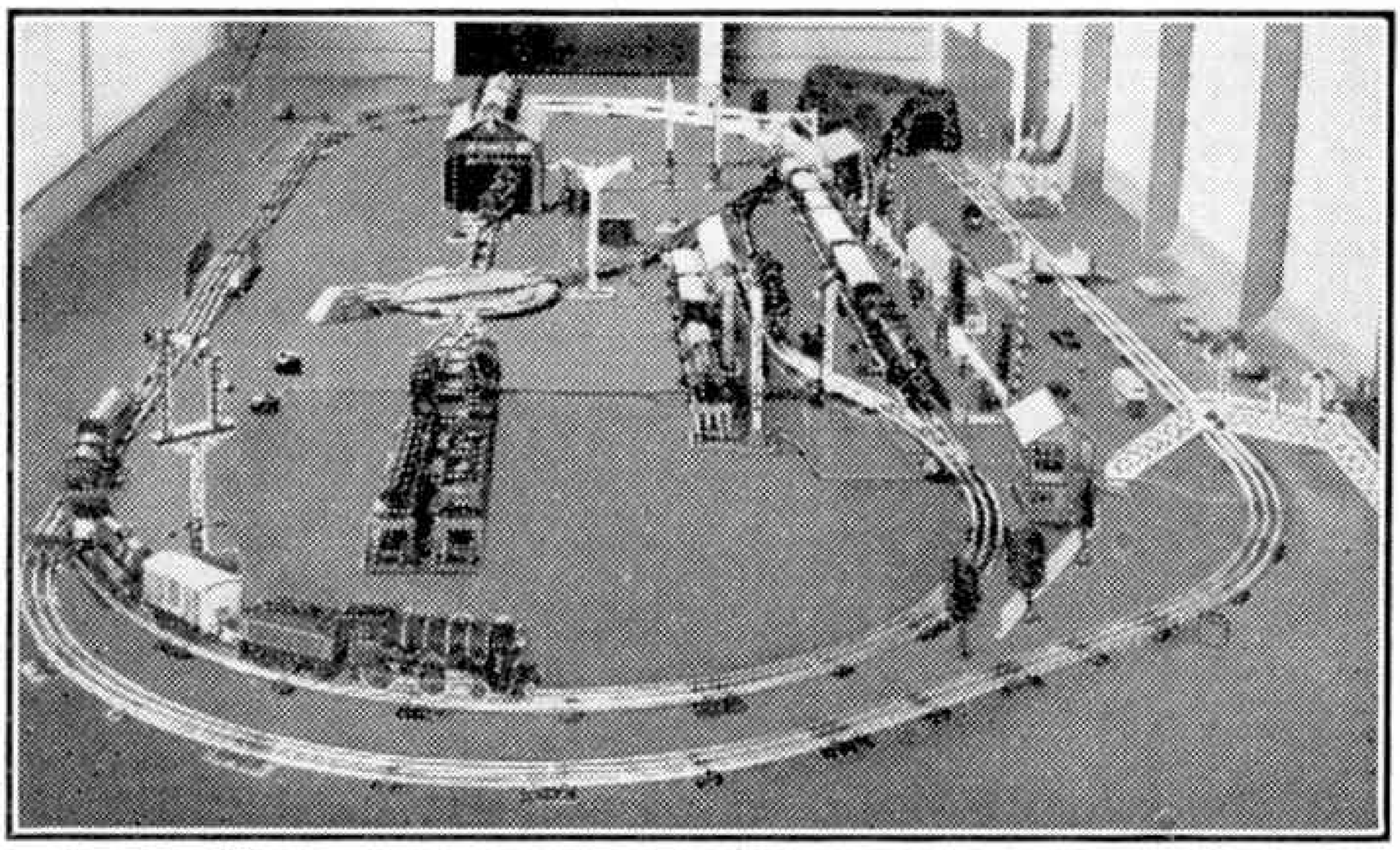
January "Cover Voting" Contest.—1. D. Counsell, Cardiff. 2. M. Balfour, Upminster. 3. D. Parker, Lapworth.

February "Crossword Puzzle" Contest.—1. W. Ede, Eton. 2. E. Miller, Exeter. 3. T. Tasker, Barnsley.

April "What Engines Are These" Contest.—1. W. A. Williams, Leicester. 2. A. G. Ford, Leicester. 3. D. Warrick, Barnsley.

April "Photographic" Contest.—1st Prizes, Section A: J. E. Martin, Wickenford. Section B: A. Rose, Ulverston. 2nd Prizes, Section A: S. S. Pethybridge, Newton Abbot. Section B: P. Faulkes, Warwick.

April "Advertisement" Contest.—1. R. D. Garwood, Cookham Rise. 2. N. Douglas, Glasgow W.4. 3. D. Kaile, Mayford.



The extensive Hornby Railway of Mr. R. W. Gillespie, Bundaberg, Queensland, Australia. A great variety of interesting operations can be enjoyed on this very practical layout.

Hornby Railway News—

(*Cont. from page 295*)

current of high voltage but of low amperage causes a loud "buzzing" in the earphones at the stations, and this immediately attracts the attention of the operators. Another point is that, instead of having separate wires for an earphone and a microphone, an earphone only is used. As the reception in the "Controller's" loud speaker would be too faint in the ordinary way, a low-frequency amplifier is used, and by this means the sound is reproduced sufficiently loudly for him to hear clearly what the station operators are saying to him.

Working the Lickey Incline—

(*Continued from page 289*)

train that ascends will have two 0–6–0 tanks banking up, much to the disappointment of any passing enthusiasts. On my arrival at Blackwell No. 2290 and 0–6–0T No. 7274 were there, and the two other 0–6–0 tanks were banking a heavy freight up. Then all four went back down to Bromsgrove together, Nos. 2290, 7274, 7425 and 7234 in that order, the 'Decapod' dwarfing the sturdy tanks. When a group of engines is descending it is the rear engine that gives the 'shove off,' as they are never coupled up."

AIRCRAFT MEMORY TEST

On the Editorial page last month I published the list of aircraft compiled from memory, in one hour, sent in by Mr. J. Parker, of Northampton. Among other lists received since then the longest is by Mr. A. R. Downie, 13, Warwick Road, New Barnet, honorary secretary of Spotters' Club No. 168. He names 161 makes of aircraft, and I congratulate him on his excellent list.

"DAVID BROWN" PHOTOGRAPHIC COMPETITIONS

A prize of £3/3/– is offered for the best action picture of a "David Brown" tractor at work in the 8th "David Brown" Photographic Contest, the closing date of which is 30th September. Negatives only should be forwarded to the Publicity Manager, David Brown Tractors Limited, Meltham, Nr. Huddersfield. After the close of the 1942 harvest season a further prize of £10/10/– will be given for the best photograph submitted during the year.

The prize in the 7th competition of the series was awarded to Mr. C. Oakes, Hawkesbury, Coventry.

EVERYBODY'S HOBBY CATALOGUE

Model Aeroplane Construction Kits. Flying and non-flying. Ship Kits. Tremo Ship Models. Dopes, Cements. Wood. Wilson Lorry Kits. Send three penny stamps for this Bumper List.

I buy Dinky Toys, condition of paint does not matter provided they are unbroken. Gauge "00" Trains, Rails, etc. Pack carefully and send Carriage Paid. Cash at once, Fair Prices Paid.

GEORGE D. CAMPBELL

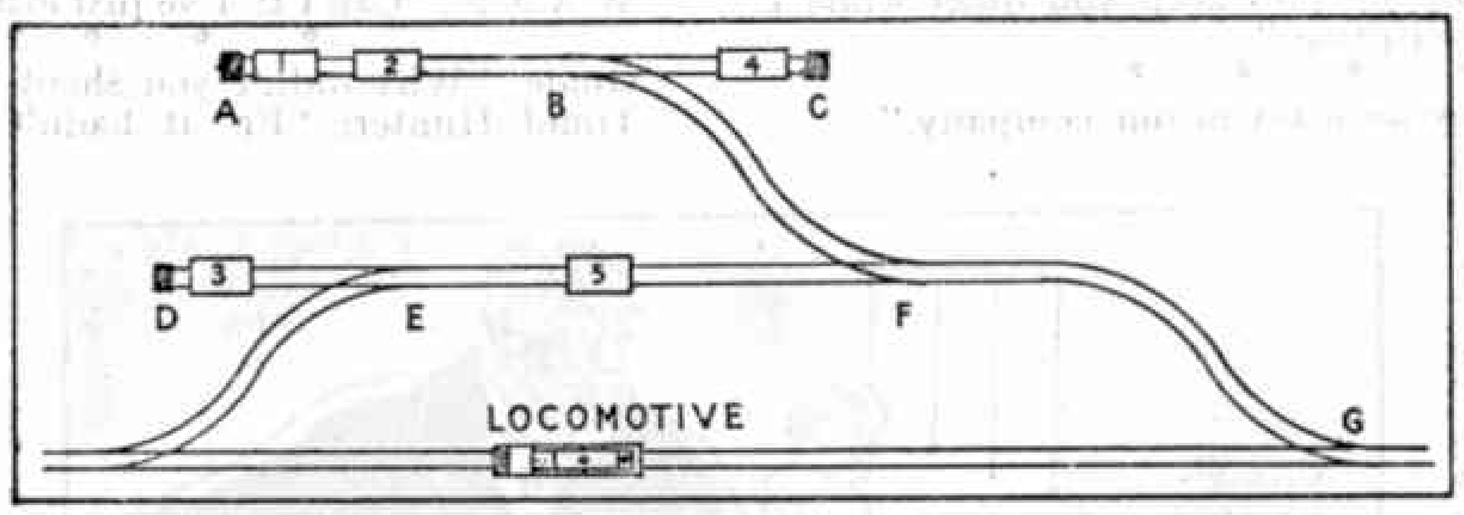
Dept. M, 46, High Street, Dumfries, Scotland

Competitions! Open To All Readers

Railway Shunting Puzzle

Probably all "*M.M.*" readers have watched a shunting engine at work. They will have seen how its apparently aimless wanderings result in the sorting out of this wagon from that, in the placing of this group of vans in that particular siding for unloading, and perhaps in the assembly of a train of various vehicles for a journey down the line.

In a large goods or marshalling yard, especially a modern one, the work is fairly straightforward, as the layout is designed for the flow of the traffic which has to be handled. In small yards, especially those attached to wayside stations, matters may not be so easy, and many an awkward shunting problem has to be solved by the local staff and the crew of a pick-up goods train that arrives to collect some wagons and to place them in order according to their destination. Layout restrictions, the sizes of certain vehicles, the regulations governing certain types of traffic and the need for doing the work reasonably quickly all have to be borne in mind.



A simple but fascinating puzzle of this kind is presented to our readers in this month's competition, which is illustrated by the diagram on this page. This represents a loop line and siding layout connected to the main line, with numbered wagons shown in various positions, and the vans are to be shunted into their correct order along the track EF. Certain parts of the sidings will not accommodate the complete train. Thus Sections BC and DE will accommodate only one van, and sections AB and FG will accommodate only the locomotive and two vans. The main line of course extends beyond the two points, so that any number of vans can be accommodated on it, but during shunting operations the locomotive must not travel more than once along the main line after entering the sidings.

Entrants in this contest are required to state the consecutive moves that are necessary to assemble the train, with the vans behind the engine in their correct order. Their statements should be as brief as possible, and competitors must not forget to write their full names and addresses on their entries.

There are the usual two sections, for Home and Overseas readers respectively, and in each there will be prizes of 21/–, 10/6 and 5/– for the best entries in order of merit. Entries must be addressed "*August Shunting Puzzle, Meccano Magazine, Binns Road, Liverpool 13.*" The closing dates are: Home Section, 31st August; Overseas Section, 31st December. Every "*M.M.*" reader can enter this contest.

Find These Hidden Names

For the holiday month of August we have arranged a competition that will give amusement and arouse interest, but does not involve much hard thinking or long preparation! What we are asking readers to do is simply to track down names hidden in the sentences below. There are 10 of these, and in each a name that can be found in some article or feature in this issue of the Magazine is concealed. It will be good fun to hunt out these names, and to find them in the Magazine.

The sentences are as follows:

1. The course is one on which there are usually fair lies for the ball.
2. After the storm the dogs had a limp rat to play with.
3. Neither stews nor rissoles seem satisfactory in our canteen.
4. Why does the car not go rightaway?
5. You should come to Risca if ever you are in this neighbourhood.
6. Mary Ambree settled down with difficulty after her adventurous life as a soldier.
7. The driver showed the greatest urge to be on the way.
8. To our forefathers a cab run electrically, or in any way without a horse, would have seemed fantastic.
9. To the prairie wanderer the buffalo was meat on the hoof.
10. You can spend a fine time rambling over the moors on the Pennine slopes.

When the names have been tracked down a list of them should be made, and against each the page number of the article or feature containing it should be given. As an example we may take the first sentence. On examination the name in this proves to be that of Fairlie, the inventor of a form of articulated locomotive, who is referred to in the article on "*Railway Working in India*" on page 274. The first line in the entry therefore should be "Fairlie, page 274."

When as full a list as possible has been prepared the competitor should add his name and address before sending his entry to "*Hidden Names Contest, Meccano Magazine, Binns Road, Liverpool 13.*"

The contest is divided into two sections, for Home and Overseas readers respectively, and in each prizes of 21/–, 10/6 and 5/– will be awarded for the best solutions. If there is a tie for any prize then neatness and originality of presentation will be taken into account by the judges. The closing dates: Home Section, 31st August; Overseas Section, 31st December.

August Photographic Contest

In this month's photographic contest prizes are offered for the best photograph of any kind submitted. There are two conditions—1, the photograph must be taken by the competitor, and 2, on the back of each print must be stated exactly what the photograph represents. A fancy title may be added if desired. We remind readers that they must not photograph any features of military importance.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16. They should be addressed "*July Photo Contest, Meccano Magazine, Binns Road, Liverpool 13.*" There will be separate sections for Overseas readers.

In each section prizes of 15/– and 7/6 will be awarded, together with consolation prizes for other good efforts. Closing dates: Home Section, 31st August; Overseas Section, 31st December.

Fireside Fun

The spoiled son of a new millionaire had been given a big hammer and was driving nails into the furniture with it.

"That's an expensive game, isn't it?" exclaimed a visitor in astonishment.

"No," replied the proud father. "I buy the nails wholesale."

* * * *

Woman Patient: "You told me to put out my tongue, and you haven't even looked at it, doctor."

Doctor: "That was only to keep you quiet while I wrote out this prescription."

* * * *

"We've got a new sergeant in our company."

"Oh, really."

"No, O'Reilly."

* * *

"No," growled the quartermaster-sergeant, "you can't have a new pair of boots. The pair you have are not worn out."

"Not worn out!" cried the soldier. "Why, if I step on sixpence, I can feel if its heads or tails."

* * *

"We want Jones to write the script for that new picture of ours," said the film magnate.

"He'd be good, but don't you think he is too caustic," replied his assistant.

"Do I care how much he costs?" retorted the producer. "Get him."

* * * *

"Yes, her boy friend took her for a walk along the cliffs every night until she got tired of it."

"What did she do?"

"Threw him over."

* * * *

"Mum, how long is it to my birthday?"

"About two weeks now, Johnny. Why?"

"I was just wondering if it is time to start being good."

* * * *

Buyer: "You guarantee that this dog is a real worker, and not just a greedy lazy hound?"

Dealer: "Absolutely. You can depend on him to work his paws to the bone."

* * * *

Captain: "What is the best method of preventing disease due to biting insects?"

Private: "Don't bite the insects, sir."

* * * *

"That man isn't working. He just sits there doing nothing all day long."

"What makes you say that?"

"I've been standing here watching him."

* * * *

Mother: "There were three pieces of cake in the pantry, and now there is only one. How is that?"

Tommy: "It was dark, and I didn't see that one."

* * * *

Little Johnny wanted to go on playing in the garden when bedtime came.

"You know, all the little chickens go to bed when the sun goes down," said his mother persuadingly.

"But the old hen goes as well," retorted Johnny.

Evacuee: "Hasn't that cow got a lovely coat."

Farmer: "Yes. That's a Jersey."

Evacuee: "Oh, a jersey. I thought it was her skin."

* * * *

R.A.F. Officer (after sudden storm): "What are you doing there?"

W.A.A.F.: "I'm looking for a 12-inch spanner I lost."

Officer: "What? You can't lose a thing like that surely."

W.A.A.F.: "Can't I! I've just lost a barrage balloon."

* * * *

Guide: "Why didn't you shoot that tiger."

Timid Hunter: "Er—it hadn't the right kind of face for a rug."

* * *

"Teacher caned me because I was the only one who could answer her question," complained Billy.

"I'll see her about that," said mother indignantly. "What was the question?"

"She wanted to know who put the gum in her inkwell."

* * *

"What do you repair boots with?" asked the small boy of the cobbler he was watching at work.

"Hide," was the curt reply.

"What do you say?"

Hotel Porter: "You've been a long time blacking those shoes!"
New Boots: "It's not my fault Sir. Some of them were brown when I started."

"Hide," shouted the cobbler.

"What do you mean?"

"The cow's outside."

"I'm not afraid of a cow. Why should I hide?"

* * * *

"How do those boys manage to keep their nice little caps on?" asked the interested old lady of a schoolmaster.

"Vacuum pressure," replied the master.

* * * *

Lawyer: "My client has always moved in the best circles."

Judge: "Six months. Take care he goes straight in future."

* * * *

"There are so many fish in our river that you can catch them by just dipping a bucket into the water."

"That's nothing. There are so many in our lake that we have to push them to one side before we can get a bucket in."

* * * *

"Don't be afraid, Sambo," said the owner of a dog that was barking furiously at the negro. "You know the proverb - a barking dog never bites."

"Ah know," replied Sambo. "But does de dog know?"

* * * *

"My handkerchief and my nose are deadly enemies."

"What do you mean?"

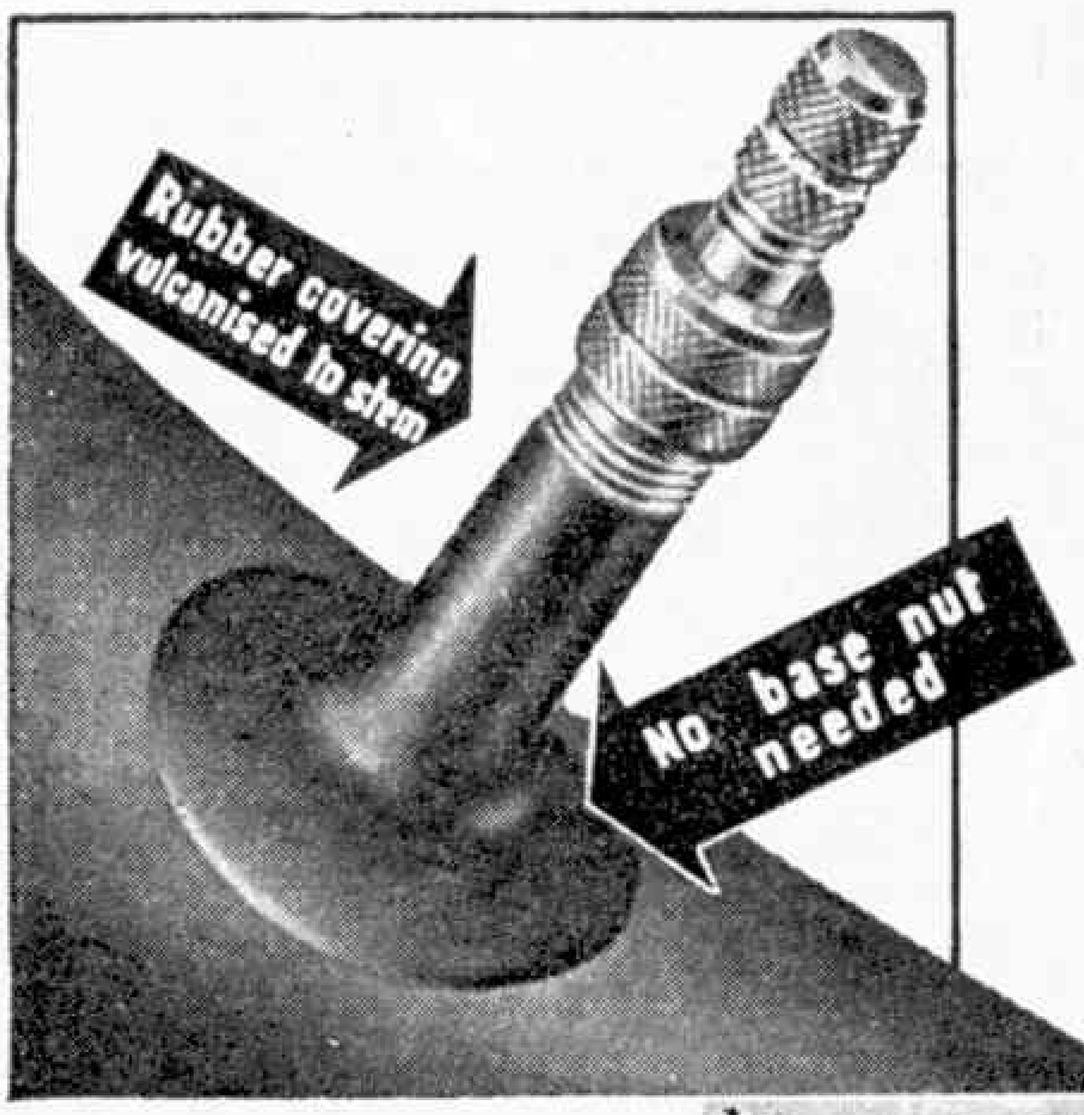
"Whenever they meet they come to blows."

* * * *

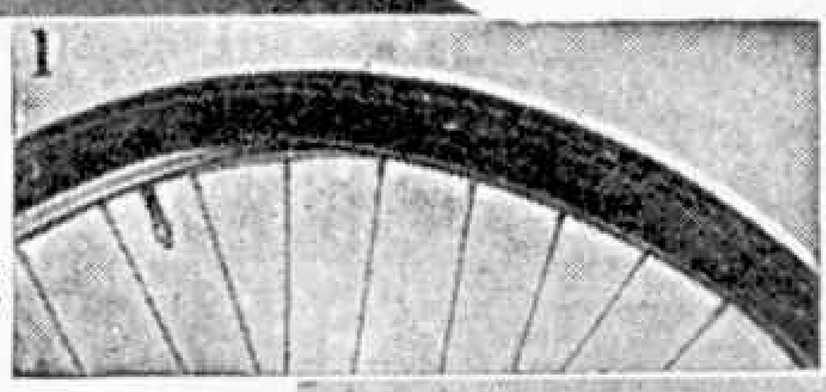
Mrs. Brown: "They say he sings like Caruso."

Mrs. Smith: "You're telling me. How do they know how Caruso sang, on a desert island with only that black man Friday to hear."

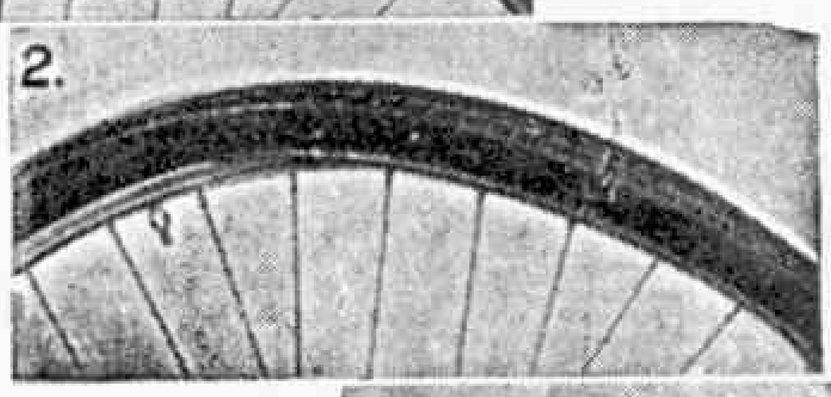
DUNLOP
introduce a cycle valve of improved design



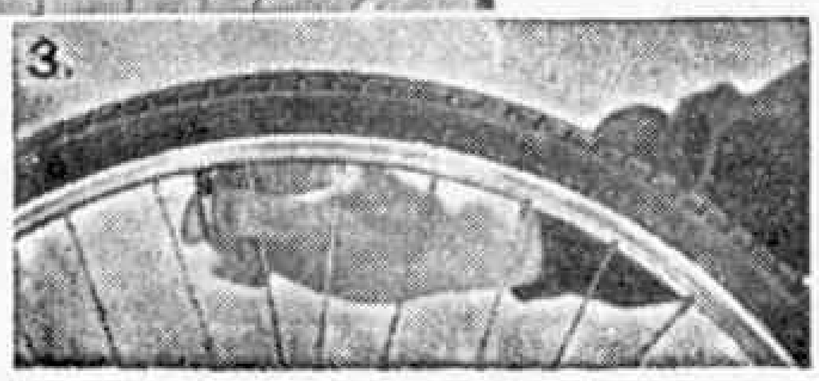
involving the use of less rubber and less metal. This valve is attached to the tube in a similar manner to that which has already been proved the most efficient on Dunlop Giant, Car and Motor Cycle tubes. The rubber covering of the valve shown is vulcanised to the metal and the rubber base is vulcanised to the tube. This ensures perfect airtightness and disposes of the need for a base nut. A small alteration in the fitting procedure of tubes with this new type valve is recommended, and is made quite clear by the accompanying photographs.



1 The final stage of fitting should be located a few inches from the valve.



2 Before pushing into position the last few inches of the cover's wired edge, push valve up into the cover to ensure that the tube is not trapped, then complete fitting.



3 After completion of fitting pull valve down into position before proceeding with inflation.

BRITISH MADE **ASTRA** TOYS OF QUALITY

MANUFACTURE SUSPENDED UNTIL AFTER THE WAR

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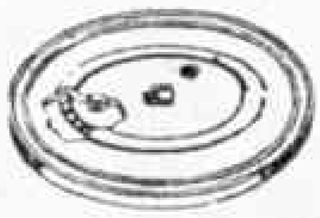

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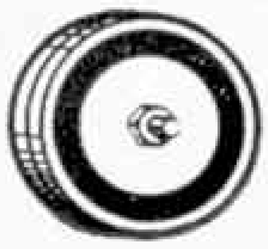

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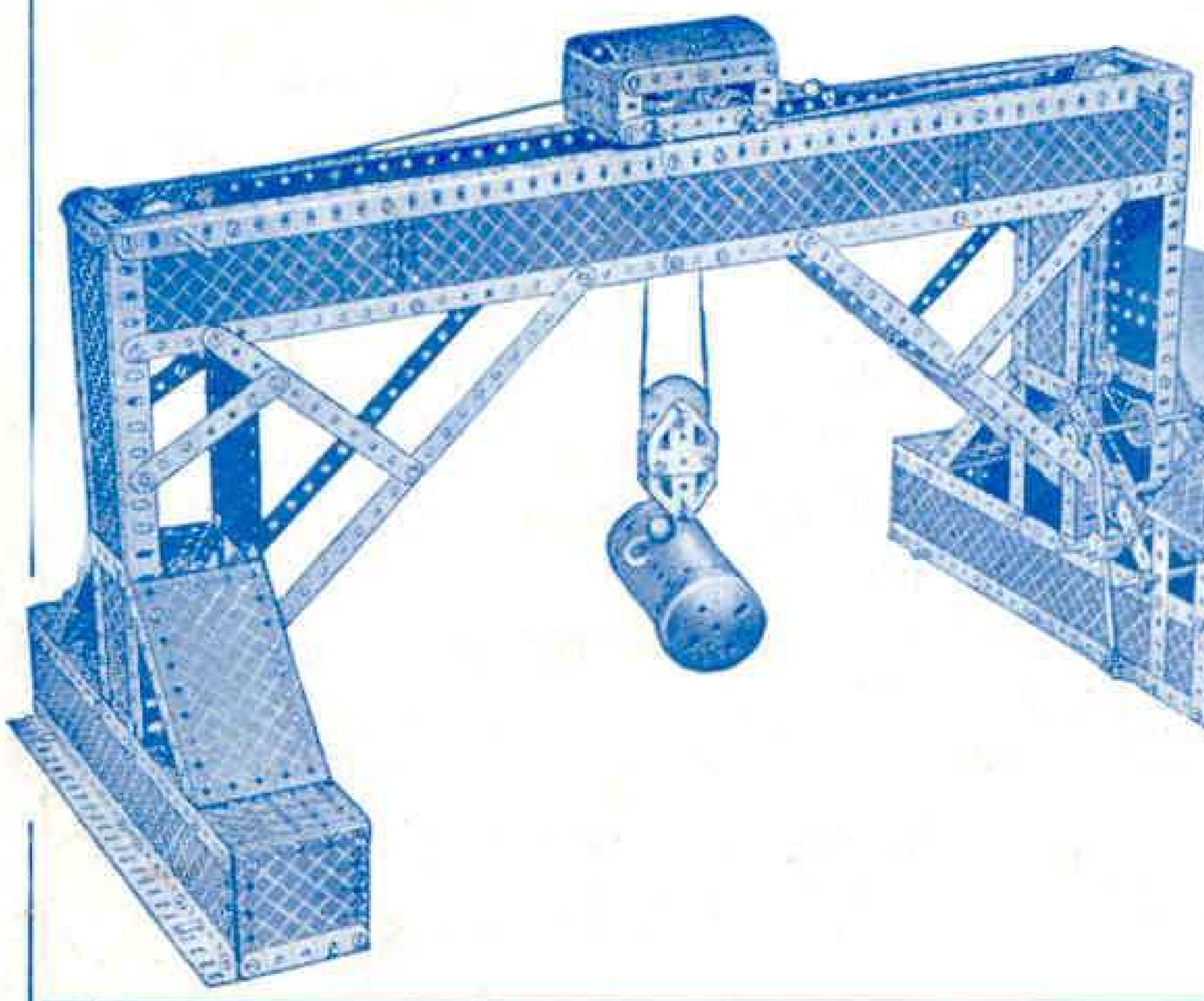

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